News about

B.F.Goodrich Chemical *raw materials*

Inset shows Hycar sleeve with tube to discharge fuel leakage for B-58 "Hustler" bombers manufactured by Convair Division of General Dynamics Corporation. Immel Engineering and Development Company, Dallas, molds the sleeve of Hycar nitrile rubber supplied by B.F.Goodrich Chemical Company.

B-58's mid-air refueling hazard reduced by Hycar

As a safeguard against leakage of volatile jet fuels, each B-58 Hustler uses sleeves made of Hycar nitrile rubber around the connection with the tanker plane's fueling pipe. Each sleeve has a tube that escorts any leaked fuel out of the plane—safely away from danger.

The flexibility of rubber is needed for this sleeve, but many properties ordinary rubber can't provide are also needed. That's why Hycar was chosen. Tough and long-lasting, it retains its flexibility even at low temperatures of high altitudes. And it is highly resistant to change when exposed to all types of petroleum base fuels.

Here's another unusual performance problem solved by Hycar. It may help you solve a problem, make possible a new application, or even a new product. For information, write Dept. RL-1, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Hycar
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B.F.Goodrich Chemical Company
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Cut down on costly throw-away loss caused by scorch. Get better bin stability . . . better states of cure by using an *activity-controlled* ELASTOMAG oxide from Morton. Three precision activity grades of ELASTOMAG—170 (high), 100 (medium), and 20 (low)—let you choose the oxide with a Morton Activity Index (MAI) that's ideal for every stock. New ELASTOMAG Micro-Pellets eliminate dusting problems. No binder or treating agent is used. In the mixer, Micro-Pellets break down to minute particles . . . provide the same superior dispersion as ELASTOMAG in the powdered form.

Get new ELASTOMAG Bulletin that summarizes tests on Neoprenes, Hypalon, and Fluoroelastomers. See how you can increase production with a new ELASTOMAG oxide. Ask your Morton Man for a copy now. Phone or write distributors below.

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Photo courtesy of Chicago Rawhide Company

Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

FEBRUARY, 1961 VOL. 88, NO. 5

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820 Rubber Covered Rolls—By John E. Hyler

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Circosol 2xH	7.5
Santocure	1
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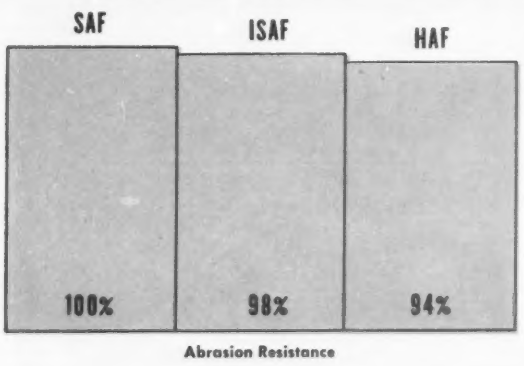

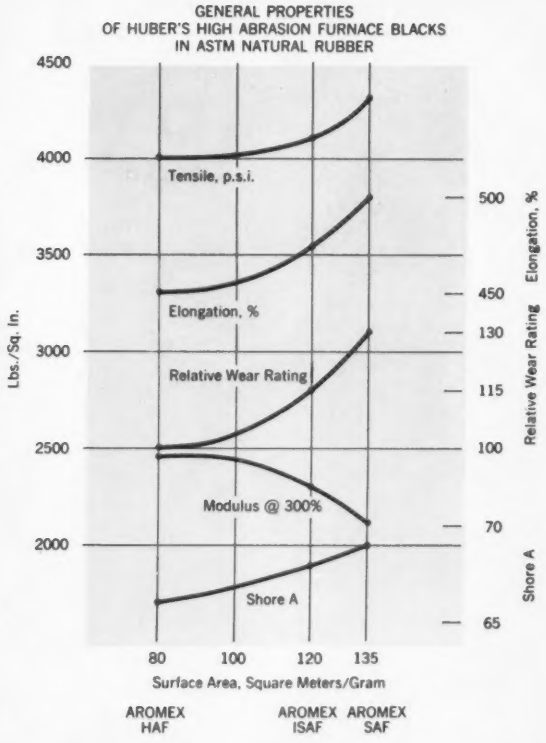

For every tread rubber requirement, AROMEX® HAF–High Abrasion Furnace Black, AROMEX ISAF–Intermediate Super Abrasion Furnace Black, and AROMEX SAF–Super Abrasion Furnace Black offer the ultimate in reinforcement, processability and uniformity.

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Wise Owls read Huber Technical Literature.

Highlights Sidelights of the News...

February, 1961

The Rubber Manufacturers Association has petitioned the Food and Drug Administration to issue a regulation approving as safe the thousands of rubber products made for use by the food and beverage industries...The RMA petition points to tests which attest to the fact that there has not been any effect on food from chemicals and compounding ingredients used in rubber manufacture (page 826). (See also editorial on page 823).

Goodyear has disclosed an $80 million capital expenditure program for 1961, $5 million more than 1960 expenditures... Goodyear's capital expenditures since 1955 now total more than half a billion dollars (page 828).

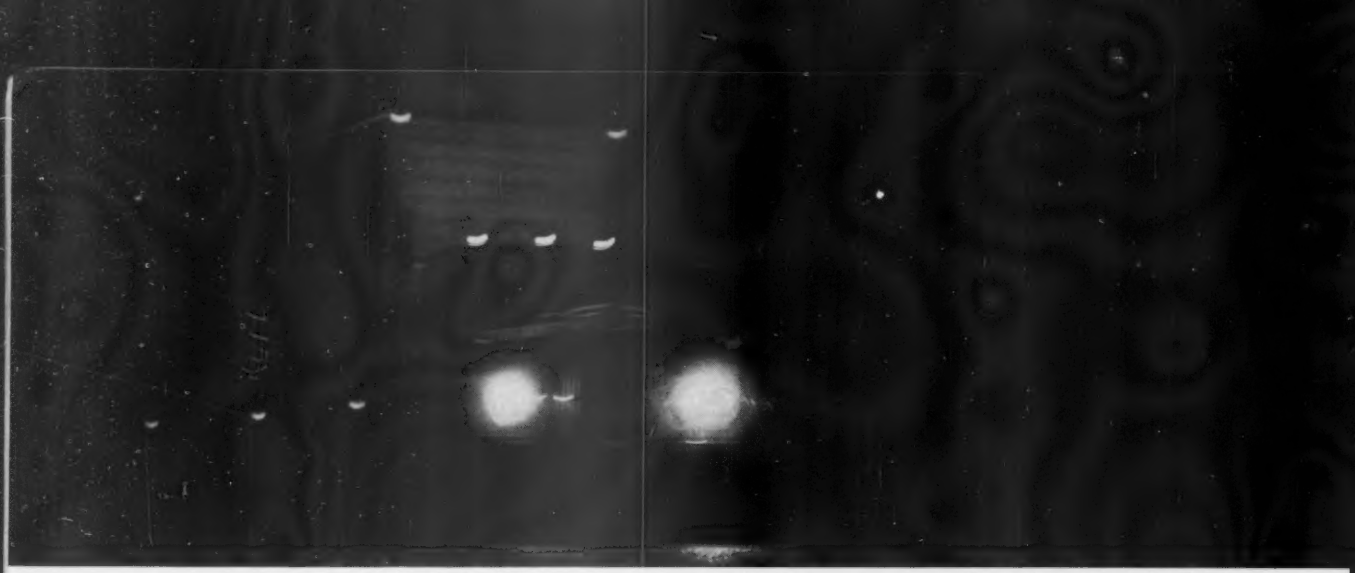
The United States Government has filed an antitrust action charging General Cable with lessening competition by acquiring, since 1955, nine corporations engaged in the wire and cable business or related activities...In its action, the Government described General Cable as the largest producer of copper and aluminum wire in the United States (page 826).

A $3 million carbon black plant with an initial rated capacity of 20 million pounds per year will be built in Venezuela by United Carbon...The new plant will be located in Valencia, site of three tire manufacturing facilities (page 827)...In other carbon black news, Cabot has received authorization from the Argentine Government for the construction of a 30 million pound per year installation (page 834).

A multi-million dollar faciity for the commercial production of Ameripol CB cis-polybutadiene synthetic rubber is being constructed at Institute, West Va., by Goodrich-Gulf Chemicals...The facility is expected to be in operation by the end of 1961 with an initial output of 20 million pounds annually (page 828).

A $70 million petrochemical complex to supply Argentina's major needs for synthetic rubber is being built at San Lorenzo...The project is being financed and constructed by an Argentine company owned by U.S. Rubber, Witco Chemical, Continental Oil, Cities Service and Fish International Corp. (page 832).

A $1 million process plant which will be devoted to the production of new types of intermediate silicone chemicals is being built by the Silicone Products Department of General Electric at Waterford, N.Y....The facility is slated to go into operation in mid-1961 (page 848).



Mixed loads of polyisoprene and many popular SBR types are now available in the East at truckload prices.

BULLETIN:

Shell Chemical offers immediate shipment of mixed loads of Shell Isoprene Rubber and SBR at carload prices

Shell Chemical offers SBR polymers, latices and new Shell Isoprene Rubber—all from a single source.

Here is how you can get immediate shipments of these polymers from Torrance, California. And how Eastern manufacturers can now purchase mixed loads of Shell Isoprene Rubber and various popular SBR types at standard truckload prices.

IN OCTOBER, 1960, Shell Chemical's newly enlarged facilities at Torrance, California, boosted polyisoprene rubber production capacity to over 3,000,000 pounds a month.

As a result, car or truckload lots of this revolutionary new rubber are now available for immediate shipment. Mixed loads of polyisoprene and any of Shell's SBR polymers can also be ordered. They will be shipped from Torrance at applicable carload prices.

Warehouses from coast to coast

Shell Chemical also stocks new Shell Isoprene Rubber and a variety of SBR polymers at eight warehouses. Their locations are: Boston, Trenton, Baltimore, Lima, Nashville, Chicago, Portland and Los Angeles.

Eastern and Midwestern manufacturers may now purchase many of these more popular SBR polymers with Shell Isoprene Rubber to round out loads meeting minimum tariff weights required for carload prices.

SHELL'S POLYMER GUIDE

The following polymers are available from Torrance, California. To order, call your nearest Shell Chemical, Synthetic Rubber Division sales office.

Polyisoprene

New Shell Isoprene Rubber. The first commercially made polymer to unite the advantages of natural and synthetic rubber. These include: high resilience, low heat build-up, excellent mold flow, uniformity, freedom from contamination, light color and ease of processing.

Because Shell Isoprene Rubber's molecular structure is *cis*-polyisoprene—the same as nature's product—it can be used for products that require natural rubber.

Since its initial introduction, manufacturers have found it suitable for heavy-duty truck tires, surgical tubing, toys, rubber thread, shoe soles and heels and dozens of other applications.

New Shell Isoprene Rubber is available in handy 65-pound bales.

Hot nonpigmented nonstaining

In addition to long-established S-1000, S-1002 and S-1006, Shell makes the following hot, clear polymers:

S-1009. Fatty acid soap—salt-acid coagulant. Cross linked with divinyl benzene, it imparts dimensional stability in extruded and calendered stocks and reduces mill shrinkage.

S-1011. Rosin acid soap—salt-acid coagulant. Uses include floor tile, pressure-sensitive tape, shoe soles and heels, wringer rolls, sporting goods and toys.

S-1013. Fatty acid soap—alum coagulant—high thermoplasticity. This gel-free 43% styrene polymer is used in adhesives, sealants and coated fabrics.

BULLETIN, CONTD.

S-7501. Fatty acid soap—alum coagulant. A low viscosity rubber. It is especially suitable for open and closed cell sponge and in battery cases and other highly loaded compounds where fast, easy processing is required.

Cold nonpigmented staining

S-1500. Rosin acid soap—salt-acid coagulant. *The* polymer for tire treads. Its uses also include hose and molded goods.

Cold nonpigmented nonstaining

S-1502. Mixed acids soap—salt-acid coagulant. This light-colored rubber is used for tires, mechanical goods, shoe soles and heels, wringer rolls and toys.

S-1509. Mixed acids soap—alum coagulant. A *low viscosity*, light-colored polymer. It is ready for immediate processing in sponge soling or rug underlay. Also used in molded and mechanical goods and mold-on shoe soling.

Cold black masterbatch

These Shell polymers are used in tires, tread rubber and mechanical goods. They provide the manufacturer a cleaner, more convenient operation. Nonstaining S-1605 is used in tire carcasses.

S-1600. Rosin acid soap—salt-acid coagulant. Contains 50 parts HAF black to 100 parts S-1500.

S-1602. Mixed acids soap—salt-acid coagulant. Contains 50 parts HAF black to 100 parts S-1502.

S-1604. Rosin acid soap—salt-acid coagulant. Contains 60 parts ISAF black and 10 parts highly aromatic processing oil to 100 parts of S-1500.

S-1605. Fatty acid soap—salt-acid coagulant. This *nonstaining* masterbatch contains 50 parts FEF black to 100 parts polymer.

S-1606. Rosin acid soap—salt-acid coagulant. Contains 52 parts HAF black and 10 parts highly aromatic processing oil in 100 parts S-1500.

S-1607. Rosin acid soap—salt-acid coagulant. Contains 60 parts HAF black and 10 parts highly aromatic processing oil in 100 parts S-1500.

S-7652. Mixed acids soap—salt-acid coagulant. It is nonstaining and contains 50 parts EPC black in 100 parts low viscosity rubber.

S-1608. Rosin acid soap—salt-acid coagulant. Contains 52 parts ISAF black and 12.5 parts highly aromatic oil in 100 parts S-1500.

Cold nonstaining oil-extended

These low-cost, light-colored Shell polymers are ideal for tires, shoe soles and heels, floor tile, sporting goods, toys, molded and extruded mechanical goods.

S-1703. Mixed acids soap—salt-acid coagulant. This light-colored polymer contains 25 parts naphthenic oil in 100 parts rubber.

S-1707. Rosin acid soap—salt-acid coagulant. It is light-colored and contains 37.5 parts naphthenic oil to 100 parts rubber.

S-1778. Mixed acids soap—salt-acid coagulant. This light-colored polymer contains 37.5 parts naphthenic oil to 100 parts rubber.

S-7702. Fatty acid soap—salt-acid coagulant. This polymer contains 50 parts naphthenic oil to 100 parts rubber. Provides excellent color and color stability.

Cold staining oil-extended

These moderately priced Shell polymers are used for applications that do not call for light color. These include tires, wire and cable insulation and molded or extruded mechanical goods.

S-1709. Rosin acid soap—salt-acid coagulant. Contains 37.5 parts aromatic oil in 100 parts rubber.

S-1710. Mixed acids soap—salt-acid coagulant. Contains 37.5 parts aromatic oil in 100 parts rubber.

S-1712. Mixed acids soap—salt-acid coagulant. Contains 37.5 parts highly aromatic oil in 100 parts rubber.

Cold oil-black masterbatch

These Shell polymers are made for convenient use in tires, tread rubber and extruded goods.

S-1800. Mixed acids soap—salt-acid coagulant. Contains 60 parts ISAF black and 10 parts highly aromatic processing oil to 100 parts S-1712.

S-1802. Mixed acids soap—salt-acid coagulant. Contains 60 parts HAF black and 14 parts highly aromatic processing oil to 100 parts S-1712.

S-1803. Mixed acids soap—salt-acid coagulant. Contains 40 parts HAF black to 100 parts S-1706.

S-1806. Rosin acid soap—salt-acid coagulant. This nonstaining rubber contains 44 parts FEF black to 100 parts S-1707.

S-1807. Rosin acid soap—salt-acid coagulant. Contains 55 parts ISAF black to 100 parts S-1709.

S-1808. Mixed acids soap—salt-acid coagulant. Contains 55 parts HAF black and 9 parts highly aromatic processing oil in 100 parts S-1712.

S-7757. Mixed acids soap—salt-acid coagulant. Contains 55 parts FEF black and 5.5 parts highly aromatic oil in 100 parts S-1712.

S-1815. Mixed acids soap—salt-acid coagulant. This nonstaining rubber contains 55 parts HAF black and 9 parts naphthenic oil to 100 parts S-1778.

Resin-rubber masterbatches

These special products offer convenience. They eliminate resin dust problems, and shorten mixing time, making lower mixing temperatures possible. They are used in shoe soles, floor tile and hard rubber goods and are available in bales or free flowing crumb form.

SP-102. Contains approximately equal parts of high styrene resin and S-1502 rubber which has a viscosity range of 46-58.

SP-103. Contains approximately equal parts of high styrene resin and S-1509 rubber which has a viscosity range of 30-38.

COMPLETE INFORMATION

For more technical information contact your nearest Shell Chemical sales office. They are located in Stamford, Conn., DAvis 5-1581; Rocky River, Ohio, EDison 3-0600 and Lakewood, California, SPruce 3-4997.

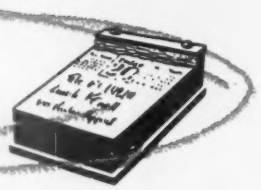
Shell Chemical's *new* synthetic rubber catalog includes complete details on all Shell polymers and latices. For a copy, write Shell Chemical, P. O. Box 216, Torrance, California.

A Bulletin from

Shell Chemical Company

Synthetic Rubber Division

coming events



Feb. 21. Elastomer & Plastics Group, Northeastern Section, American Chemical Society, Technical Meeting, Morse Auditorium, Boston, Mass.

Feb. 24. Quebec Rubber & Plastics Group, Ladies' Night, Victoria Hall, Montreal, Quebec, Canada.

March 7. Buffalo Rubber Group, Spring Meeting, Hotel Westbrook, Buffalo, N. Y.

March 7. Los Angeles Rubber Group, Hotel Biltmore, Los Angeles, Calif.

March 8. Washington Rubber Group, Field Trip to Fort Belvoir, Va.

March 9. Elastomer & Plastics Group, Northeastern Section, American Chemical Society, Technical Meeting, Morse Auditorium, Boston, Mass.

March 10. Chicago Rubber Group, Technical Meeting, Furniture Club, Chicago, Ill.

March 14. Ontario Rubber Group, Joint Meeting with Wellington-Waterloo Section, Chemical Institute of Canada, Walper Hotel, Kitchener, Ontario, Canada.

March 17. Boston Rubber Group, Spring Meeting, Somerset Hotel, Boston, Mass.

March 21-23. American Physical Society, High Polymer Physics Division, 21st Annual Meeting, Monterey, Calif.

March 21-30. American Chemical Society, 139th National Meeting, St. Louis, Mo.

March 23. Quebec Rubber & Plastics Group, Technical Meeting, Queen's Hotel, Montreal, Quebec, Canada.

March 23. Southern Ohio Rubber Group, Spring Technical Meeting.

March 24. New York Rubber Group, Spring Meeting, Henry Hudson Hotel, New York, N. Y.

April 4. Los Angeles Rubber Group, Technical Meeting, Hotel Biltmore, Los Angeles, Calif.

April 6. Akron Rubber Group, Spring Meeting, Sheraton Hotel, Akron, Ohio.

April 6. Rhode Island Rubber Club, Spring Meeting, Pawtucket Country Club, Pawtucket, R. I.

April 11. Ontario Rubber Group, Clover Hotel, Toronto, Ontario, Canada.

April 13. Fort Wayne Rubber & Plastics Group, Technical Meeting, Van Orman Hotel, Fort Wayne, Indiana.

April 19-21. Division of Rubber Chemistry, American Chemical Society, Spring Meeting, Brown Hotel, Louisville, Ky.

April 19. Quebec Rubber & Plastics Group, Technical Meeting, Queen's Hotel, Montreal, Quebec, Canada.

April 19. Washington Rubber Group, Ladies Night, Washington, D. C.

April 21. Detroit Rubber & Plastics Group, Spring Meeting, Wolverine Hotel, Detroit, Michigan.

April 27-28. Electric Wire & Cable Section, Wire Association, Regional Meeting, Sheraton-Atlantic Hotel, New York, N. Y.

April 28. Chicago Rubber Group, Technical Meeting, Furniture Club, Chicago, Ill.

April 28. Philadelphia Rubber Group, Technical Meeting, Poor Richard Club, Philadelphia, Penna.

May 2. Los Angeles Rubber Group.

May 12. Buffalo Rubber Group-Ontario Rubber Group, Joint Meeting, Sheraton Brock Hotel, Niagara Falls, Ontario, Canada.

May 16. Elastomer & Plastics Group, Northeastern Section, American Chemical Society, Annual Short Talks Meeting, Morse Auditorium, Boston, Mass.

May 17. Washington Rubber Group, Annual Meeting, Pepco Auditorium, Washington, D. C.

May 19. Connecticut Rubber Group, Technical Meeting.

June 1. New York Rubber Group, Summer Outing, Old Cedar Mill Grove, Union, N. J.

June 2. Quebec Rubber & Plastics Group, Golf Outing, St. Hyacinthe, Quebec, Canada.

June 3. Southern Ohio Rubber Group, Summer Outing.

June 8. Rhode Island Rubber Club, Summer Outing, Pawtucket Country Club, Pawtucket, R. I.

June 9. Fort Wayne Rubber & Plastics Group, Summer Outing, Tippecanoe Lake Country Club, Ft. Wayne, Ind.

June 13. Buffalo Rubber Group, Summer Outing, Lancaster Country Club, Buffalo, N. Y.

June 16. Akron Rubber Group, Summer Outing, Firestone Country Club, Akron, Ohio.

June 16. Boston Rubber Group, Summer Outing, Andover Country Club, Andover, Mass.

June 23. Detroit Rubber & Plastics Group, Summer Meeting, Western Country Club, Detroit, Mich.

June 23-24. Southern Rubber Group, Buena Vista Hotel, Biloxi, Miss.

June 25-30. ASTM Annual Meeting, Chalfonte-Hall, Atlantic City, N. J.

August 4. Rubber Chemistry Division, Chemical Institute of Canada, Technical Meeting, Queen Elizabeth Hotel, Montreal, Quebec, Canada.

August 10. New York Rubber Group, Golf Outing, Scotch Plains and Echo Lake Country Clubs, Scotch Plains and Westfield, N. J.

Aug. 18. Philadelphia Rubber Group, Golf Outing, Manufacturers Country Club, Oreland, Penna.

Sept. 3-8. American Chemical Society, 140th National Meeting, Chicago, Ill.

Sept. 5-8. Division of Rubber Chemistry, American Chemical Society, Sherman Hotel, Chicago, Ill.

Sept. 9. Connecticut Rubber Group, Annual Outing.

Sept. 21. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

Sept. 28. Southern Ohio Rubber Group, Fall Technical Meeting.

Oct. 10. Buffalo Rubber Group, Fall Meeting, Hotel Westbrook, Buffalo, N. Y.

Oct. 13. Boston Rubber Group, Fall Meeting, Somerset Hotel, Boston, Mass.

Oct. 20. Akron Rubber Group, Technical Meeting, Sheraton Hotel, Akron, Ohio.

Oct. 20. Joint Meeting of New York, Connecticut and Philadelphia Rubber Groups, Henry Hudson Hotel, New York, N. Y.

Nov. 2. Rhode Island Rubber Club, Fall Meeting, Pawtucket Country Club, Pawtucket, R. I.

Nov. 3. Philadelphia Rubber Group, Fall Dance, Manufacturers Country Club, Oreland, Penna.

Nov. 17. Connecticut Rubber Group, Technical Meeting.

Nov. 26-Dec. 1. American Society of Mechanical Engineers, Winter Annual Meeting, Statler Hilton Hotel, New York, N. Y.

Dec. 1. Tenth Annual Wire & Cable Symposium, Berkeley-Carteret Hotel, Asbury Park, N. J.

Dec. 7. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

Dec. 9. Southern Ohio Rubber Group, Christmas Party.

Dec. 12. Buffalo Rubber Group, Christmas Party, Buffalo Trap and Field Club, Buffalo, N. Y.

Dec. 15. Boston Rubber Group, Christmas Party, Somerset Hotel, Boston, Mass.

Dec. 15. New York Rubber Group, Christmas Party, Henry Hudson Hotel, New York, N. Y.

April 24-27, 1962. Division of Rubber Chemistry, American Chemical Society, Hotel Statler, Boston, Mass.

Oct. 16-19, 1962. Division of Rubber Chemistry, American Chemical Society, Hotel Cleveland, Cleveland, Ohio.

May 7-10, 1963. Division of Rubber Chemistry, American Chemical Society, Royal York Hotel, Toronto, Ontario, Canada.

Sept. 10-13, 1963. Division of Rubber Chemistry, American Chemical Society, Hotel Commodore, New York, N. Y.

April 28-May 1, 1964. Division of Rubber Chemistry, American Chemical Society, Sheraton-Cadillac Hotel, Detroit, Mich.

Sept. 1-4, 1964. Division of Rubber Chemistry, American Chemical Society, Sherman Hotel, Chicago, Ill.

Spring 1965. Division of Rubber Chemistry, American Chemical Society, Miami Beach, Fla.

Oct. 19-22, 1965. Division of Rubber Chemistry, American Chemical Society Bellevue-Stratford Hotel, Philadelphia, Penna.

May 3-6, 1966. Division of Rubber Chemistry, American Chemical Society, Fairmount Hotel, San Francisco, Calif.

May 2-5, 1967. Division of Rubber Chemistry, American Chemical Society, Queen Elizabeth Hotel, Montreal, Quebec, Canada.

Sept. 12-15, 1967. Division of Rubber Chemistry, American Chemical Society, Sherman Hotel, Chicago, Ill.

Photograph taken with the cooperation of Pretty Products, Coshocton, Ohio, and The Ceramaflex Division of U.S. Ceramic Tile Company, Canton, Ohio.

PLIOFLEX takes the stumbling block out of new flooring

The idea was a natural — ceramic tiles for flooring set in 9"x9" rubber grid sheets. It opened new markets, suggested myriad designs. And it would make flooring resilient, quiet, easy on the feet, easy and economical to install.

The stumbling block: finding a low-cost rubber that wouldn't deteriorate and discolor with age.

Then a leading manufacturer tried PLIOFLEX 1773. Its cost was right. So were its physical properties. And its good color retention and ultraviolet resistance licked the age-color obstacle. What's more, PLIOFLEX offers top processing ease, maximum uniformity and outstanding molding characteristics. Result? Fewer rejects — more profit.

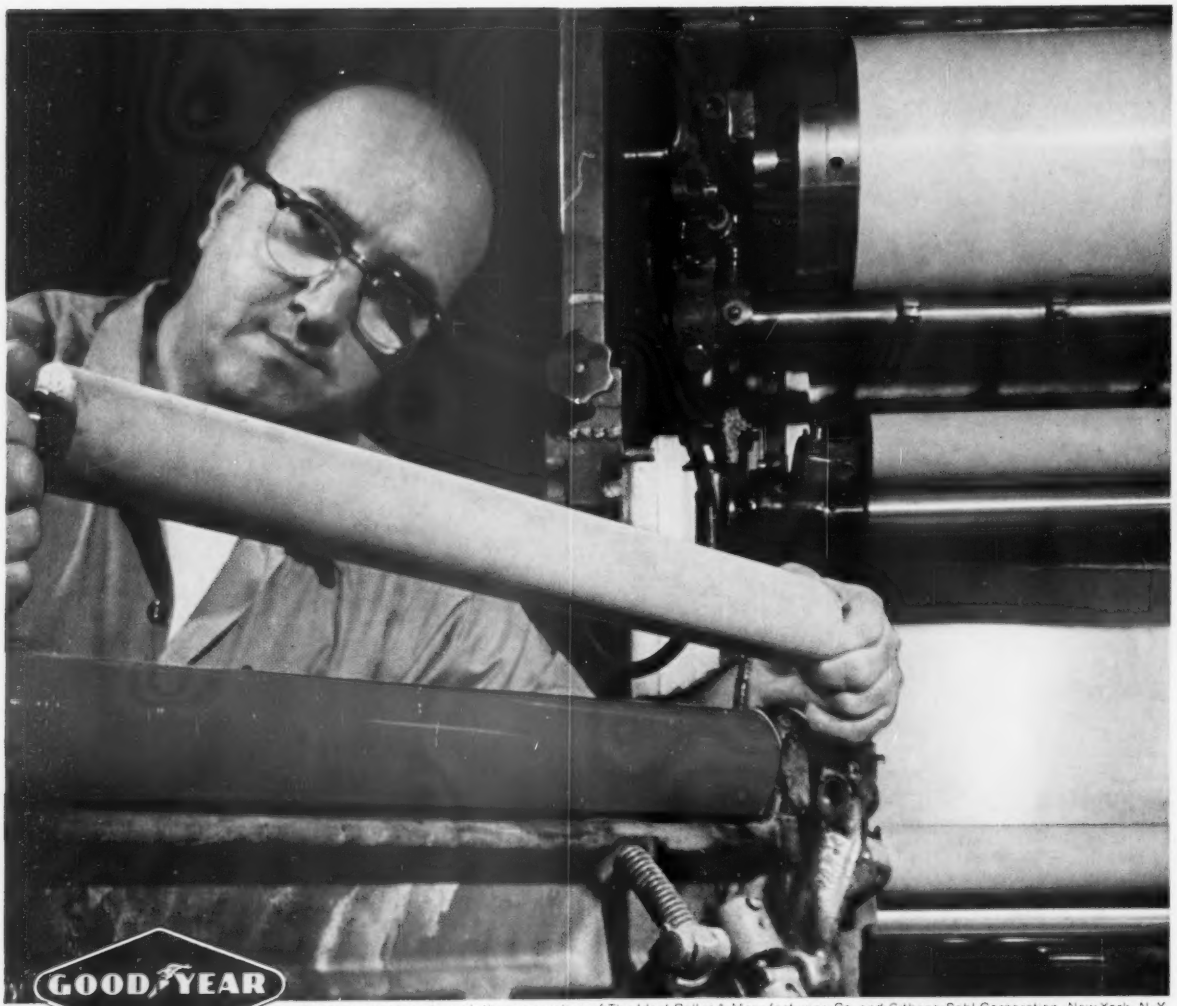
If you want to invade a new market or improve an old product, look into PLIOFLEX. For full details and outstanding technical help, simply write Goodyear, Chemical Division, Dept. B-9419, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

CHEMICAL DIVISION

Plioflex – T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



Photograph taken through the cooperation of The Ideal Roller & Manufacturing Co. and Githens-Sohl Corporation, New York, N.Y.

They multiply inking roller life 16 times—with CHEMIGUM

Each new season used to call for new inking rollers on "job" printing presses. Glue composition rollers would swell, soften—even melt—in hot and humid weather. And they would shrink and harden in cool, dry weather. Valuable time was lost, printing quality varied.

A leading roller manufacturer found CHEMIGUM N-8 a year-round answer to the problem. CHEMIGUM N-8 effectively resists climatic changes. Its soft, smooth surface means proper ink pickup and release. Its oil- and solvent-resistance makes it more durable, easy to clean. What's more, CHEMIGUM is extremely easy to process, keeps costs down. And the new rollers last—not a season—but up to 4 years!

How can CHEMIGUM rubber or latex help you improve your product or enter a new market? Full details plus expert technical assistance are yours at Goodyear Chemical Division, Dept. B-9419, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

CHEMICAL DIVISION

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CO_2 by Mathieson

There are two reasons why you can count on Mathieson carbon dioxide in your production line. One is dependability of product. Mathieson CO_2 will thoroughly chill-harden soft rubber pieces (as a liquid, it can be expanded directly into tumbling barrels) before trimming or machining.

The second advantage Mathieson carbon dioxide gives you is *service*. Our modern production and distribution facilities, the 18 convenient sales offices and warehouses listed below assure you quick, reliable delivery. And the experience and knowledge of the Olin Mathieson man are available to answer any CO_2 questions you may have. If you need carbon dioxide, either in dry ice or low pressure liquid CO_2 form, or want more information, call the warehouse nearest you.

Olin Mathieson

Chemical Corporation
Baltimore 3, Maryland

Sales office and warehouse locations:

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Charlotte, N.C.
Chattanooga, Tenn.
Chicago, Ill.
Greensboro, N.C.
Jacksonville, Fla.
Memphis, Tenn.
Nashville, Tenn.
Newark, N.J.
New Orleans, La.
New York, N.Y.
Norfolk, Va.
Philadelphia, Pa.
Richmond, Va.
Saltville, Va.
Washington, D.C.

8969

News in Brief

► "Zalba Special," Report No. 59-3, offered by the Elastomer Chemicals Department of E. I. du Pont de Nemours and Co., Inc., Wilmington, Del., describes a non-staining, non-discoloring antioxidant which comes in a free flowing powder and can, according to DuPont, be incorporated into dry elastomers and dispersed in water for use in latex compounds.

► A booklet entitled "Ameripol Micro-Black," has been issued by Goodrich - Gulf Chemicals, Inc., Cleveland, Ohio. Seven Micro-Black masterbatches are described in the brochure; applications, advantages and properties of different types are covered.

► Increasing problems of highway safety is the theme of a new booklet made available by the General Tire and Rubber Co., Akron, Ohio. Entitled "The Jet Age of Driving Demands a New Safety Outlook," the booklet cites statistics and causes of accidents, and underlines some basic rules for tire inspection.

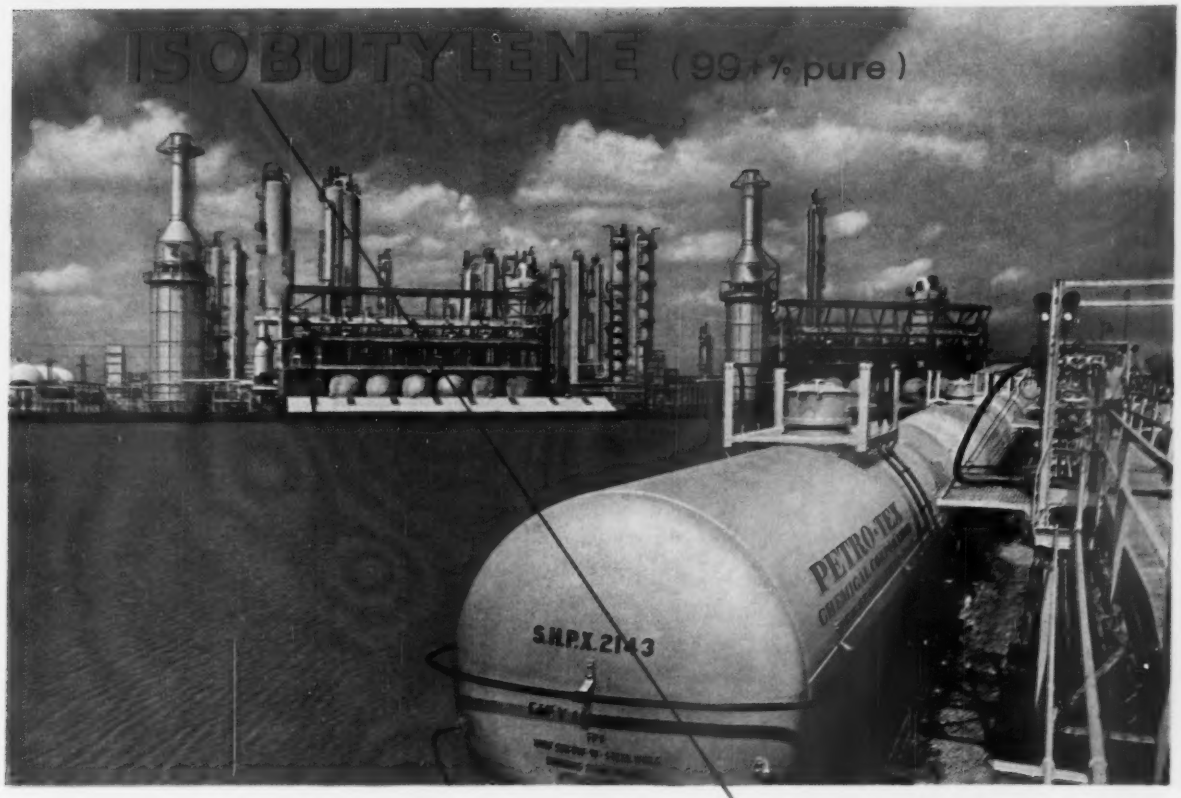
► "Firestone Opens New Horizons in Petrochemicals" is an illustrated brochure which in addition to touching on company history, stresses the company's petrochemical products: FR-S, Exon, butadiene, Coral, Diene, Butaprene - SL, Butaprene - PL, and Butaprene-N. Available from the Firestone Tire and Rubber Co., Akron, Ohio.

► A new alkyd resin system utilizing trichlorofluoromethane as the foaming agent is described in Preliminary Technical Bulletin No. 14 issued by Hooker Chemical Corp., Niagara Falls, N. Y. The system was developed specifically for the preparation of rigid fire-resistant polyurethane foams with low K factor.

► Arthur D. Little, Inc., has moved its New York office to 529 Fifth Avenue. The new telephone number of the office is MUrray Hill 7-4430.

► A check list for applications of Thiokol crude rubbers and chemicals, stressing the advantages which the company feels its products offer, and a bulletin on the use and application of the firm's foaming resin, are available from Thiokol Chemical Corp., Trenton, N. J.

New Horizons for



Petro-Tex Isobutylene finds ever-widening use as a starting material for new and improved end-products. Typical relatively-recent applications (which may suggest equally interesting *new* developments) include:

In conjunction with stereospecific catalysts, to make high molecular weight polyisobutylene resins. Blends of these polymers with certain polyethylenes and polypropylenes result in improved end-products (for instance: more flexible, high dielectric strength cable coatings).

To make high-purity, low molecular weight polyisobutylene viscous liquids (frequently called polybutenes). Addition of high-purity isobutylene to the feed stock substantially improves product quality.

As a starting material for tertiary butyl derivitives.

To make copolymers of polyisobutylene with butadiene, acrylonitrile, styrene and other monomers, as indicated in the literature.

Petro-Tex has major continuous non-captive Isobutylene production which is now supplying a substantial part of current chemical industry requirements.

SEND FOR "FAMILY TREE" CHART

To facilitate research on other new uses for Petro-Tex Isobutylene, we offer an Isobutylene "Family Tree" chart showing present uses and all reported reactions having new-product significance. A bibliography of 213 references is keyed to this very useful chart.

We will also be glad to furnish specifications, price and delivery quotations on Petro-Tex Isobutylene and

n-BUTENE-1 n-BUTENE-2
BUTADIENE DIISOBUTYLENE TRIISOBUTYLENE

Petro-Tex®

PETRO-TEX CHEMICAL CORPORATION

8600 PARK PLACE, HOUSTON 17, TEXAS

JOINTLY OWNED BY
fmc FOOD MACHINERY AND CHEMICAL CORPORATION
TENNESSEE GAS TRANSMISSION COMPANY

ST. JOE

"Controlled-Analysis"

ZINC OXIDES
For The
RUBBER INDUSTRY

Direct Reporting On Baird-Atomic Spectrometer

RUBBER GRADE — FAST CURING TYPES

BLACK LABEL No. 20

Very fine particle size, giving maximum reinforcement and activation in rubber. For highest quality rubber goods.

RED LABEL No. 30

Excellent reinforcing and activating properties in rubber. Having fewer extremely fine particles, it is easier to incorporate than Black Label No. 20.

RUBBER GRADE — SLOW CURING TYPES

RED LABEL No. 31

Slow curing type for long flat cures and excellent scorch resistance. Good activating and reinforcing properties.

RUBBER GRADE — SURFACE TREATED TYPES

BLACK LABEL No. 20-21
GREEN LABEL No. 42-21

These grades are made from Black Label No. 20 and Green Label No. 42, respectively, by surface treating with a nontoxic hydrophobic high molecular weight organic material. They disperse in a rubber mix rapidly and thoroughly, developing physical properties, in vulcanized rubber comparable to standard Black Label No. 20 and Green Label No. 42.

LATEX GRADE

BLACK LABEL No. 20

Very fine particle size, giving minimum settling out in water dispersions and maximum activation in Latex Compounds.

GREEN LABEL No. 12

Heavily-calcined Black Label No. 20 type, containing few extremely fine particles. Less reactive than Black Label No. 20 and produces low viscosity water dispersions which do not readily thicken.

GREEN LABEL No. 42

General purpose type. Excellent activating and moderate reinforcing properties. Faster rate of incorporation into rubber than Black Label No. 20 or Red Label No. 30.

GREEN LABEL No. 43

Large particle size type for easy incorporation. Good activating and reinforcing properties.

GREEN LABEL No. 42A-3

Somewhat larger in particle size than Red Label No. 31 for easier incorporation; otherwise, similar in general characteristics.

GREEN LABEL No. 46

Low pH type used in foam latex where zinc oxide is used for both activation and as a supplementary gelling agent.

RED LABEL No. 30

Intermediate particle size, having fewer extremely fine particles than Black Label No. 20. Less reactive than Black Label No. 20, producing lower viscosity water dispersions which do not readily thicken.

GREEN LABEL No. 43

Medium particle size for easy wetting. In pellet form this grade is particularly advantageous in preparing pourable 70% zinc oxide water dispersions.

LEAD-FREE ST. JOE ZINC OXIDE

St. Joe's Distributor Network Puts St. Joe ZnO On Your Doorstep.

AKRON, O.	DENVER, COLO.	LONG ISLAND CITY, N. Y.	ST. LOUIS, MO.
ALBERTVILLE, ALA.	DETROIT, MICH.	LOS ANGELES, CAL.	ST. PAUL, MINN.
BALTIMORE, MD.	GREENVILLE, S. C.	MEMPHIS, TENN.	SAN ANTONIO, TEX.
BOSTON, MASS.	HOUSTON, TEX.	OKLAHOMA CITY, OKLA.	SAN FRANCISCO, CAL.
BUFFALO, N. Y.	HUNTINGTON, W. VA.	OMAHA, NEB.	SEATTLE, WASH.
CHICAGO, ILLINOIS	JACKSONVILLE, FLA.	PHILADELPHIA AREA, PA.	TRENTON, N. J.
CINCINNATI, O.	KANSAS CITY, MO.	PITTSBURGH AREA, PA.	TULSA, OKLA.
DALLAS, TEX.	LITTLE ROCK, ARK.	PORTLAND, ORE.	WICHITA, KAN.

Write for the name of the St. Joe distributor nearest you.

ST. JOSEPH LEAD CO.

250 Park Avenue • New York 17, N. Y.
Plant & Laboratory: Josephtown (Monaca) Pa.

ZNO-158

Announcing—

the production of HAF and ISAF carbon blacks at our new ECHO Philblack* plant, Orange, Texas. This gives Phillips customers added assurance of a continuing supply of these high quality blacks.

PHILLIPS CHEMICAL COMPANY
Rubber Chemicals Sales Division, Akron, Ohio

*A trademark

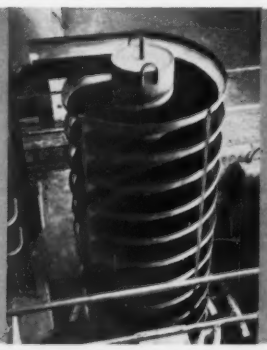
PHILLIPS 66

MEET CHARLIE BALDWIN – United Carbon district sales manager and a first-rate chef in his off-duty hours.

In cooking, correct proportioning, mixing and blending are essential to every dish – particularly mulligan stew "Baldwin style."

In our business it's the proportioning, mixing and blending that counts too. At Baytown, where better masterbatches are made, the best controlled proportioning, mixing and blending are your assurance of the right product.

MULLIGAN OR MASTERBATCH



Production control utilizing highly automated systems assures product uniformity in each bale of Baytown black masterbatch. Pictured here is the washed masterbatch crumb as it journeys toward the final dewatering and baling steps.

Mixing is one function of the new United-Barclay Process* for producing higher quality, more uniform black masterbatches. The new process results in masterbatch products with greater overall uniformity, including more uniform specific gravity and carbon black dispersion. These characteristics, in turn, mean that rubber product manufacturers can depend on Baytown masterbatches for consistently better in-plant processing and better performance characteristics in the finished rubber goods.

These dispersant-free, low salt, low volatile content Baytown masterbatches offer increased output in your plant. For example, the lower residual nerve encountered in these new products has resulted in shorter cycles in commercial mixing as well as faster extrusion rates.

For more information on how Baytown black masterbatches can cut your costs and improve end product service contact:

UNITED CARBON COMPANY, INC.
410 PARK AVENUE, NEW YORK 22, N. Y.
A Subsidiary of United Carbon Company
AKRON CHICAGO LOS ANGELES
BOSTON HOUSTON MEMPHIS
In Canada: CANADIAN INDUSTRIES LIMITED

UNITED CARBON

BAYTOWN—The Birthplace of Black Masterbatch

*Patents Applied For

DON'T FORGET
Division of
Rubber Chemistry
A.C.S. CONVENTION
Louisville, Kentucky
April 19, 20, and 21

THE POLYMEL CORPORATION
POLYMEL BUILDING
514-516 ENSOR STREET
BALTIMORE 2, MARYLAND

Sales Agents:
EASTERN DISTRIBUTORS:
Summit Chemical Co.,
Akron, Ohio

MID-WEST DISTRIBUTORS:
Herron & Meyer,
38 S. Dearborn St.,
Chicago, Illinois

we're having an unprecedented acceptance for our newest processing aid

POLYMEL PLASTICIL

lower prices - easier handling

A New Free-Flowing Powder For Compounding and Extending
GRS. NATURAL RUBBER, NEOPRENE AND RECLAIM

Polymel's new Plasticil does the job better . . . faster . . . and more economically! This material has splendid softening action in neoprene, natural rubber and GRS polymers and is highly compatible. Plasticil will not only act to give good flexibility, good abrasion resistance, excellent mold-ability, but it can be used from 5 to 35 parts on the rubber to obtain excellent processing without any deleterious effect on the physical properties of the finished product. Plasticil can be used to great advantage in Footwear Stocks, Sponge Compounds, Wire Insulation Compounds, Rubber Mats, Tires, Tire Tread Stocks, Footwear Materials and all types of mechanicals. It is practically free of any discoloring effects.

PRICES: Truckloads ..... 10½ cents • 5000 lb. Truckloads ..... 10¾ cents • 1 Drum to 5000 lbs. ..... 11¾ cents.

AVAILABLE in any quantity. Write for FREE Sample and Technical Data, Now!

IT'S POLYMEL FOR compounding ingredients for Reinforcing, Plasticizing, Extending and Processing Natural and Synthetic Elastomers AND RELATED PRODUCTS.

ALL PRICES F.O.B. Factory

For the exact SHADE OF WHITE

to help you sell your product

GLIDDEN ZOPAQUE®

TITANIUM DIOXIDE

Salesmen, sales managers and other marketing people throughout the rubber industry know the difference the *exact shade* of white can make. There are glossy whites, flat whites, non-yellowing whites, striking, "blue" whites, off-whites, transparent whites, non-marking whites . . .

So marketing, as well as production and technical men, are learning the values of Glidden *Zopaque* Titanium Dioxide. *Zopaque* gives you *certain* optical qualities for high opacity, hiding strength and tinting power.

Find out now how Glidden *Zopaque* Titanium Dioxide can help you make your products more saleable.

QUALITY Glidden PRODUCTS

THE GLIDDEN COMPANY

FINEST PIGMENTS FOR INDUSTRY

Chemicals Division • Pigments and Color Department
Baltimore 26, Maryland

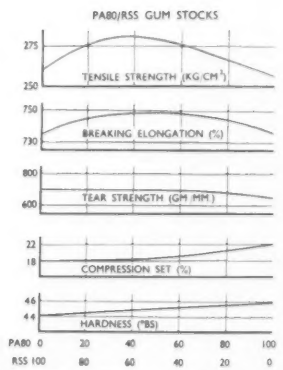
(This advertisement is printed on paper stock containing Glidden *Zopaque* Titanium Dioxide.)

The latest addition to the family

. . . . . is a SPLENDID MIXER

PA 80 RUBBER, latest addition to the family of SP rubbers from Malaya, mixes happily with any grade of natural rubber or with general purpose synthetic rubbers, and what a good influence it is!

How PA 80 maintains quality is shown in the graph for blends with RSS in a pure gum stock. It may be used to meet exacting specifications in extrusion compounds, to control shrinkage of calendered sheet, to firm up very soft stocks, to reduce air trapping in difficult mouldings, etc. If there is a difficult job to do in the factory SP rubber or PA 80 may well be the answer.



For further information on SP rubber and PA 80 just drop us a line.

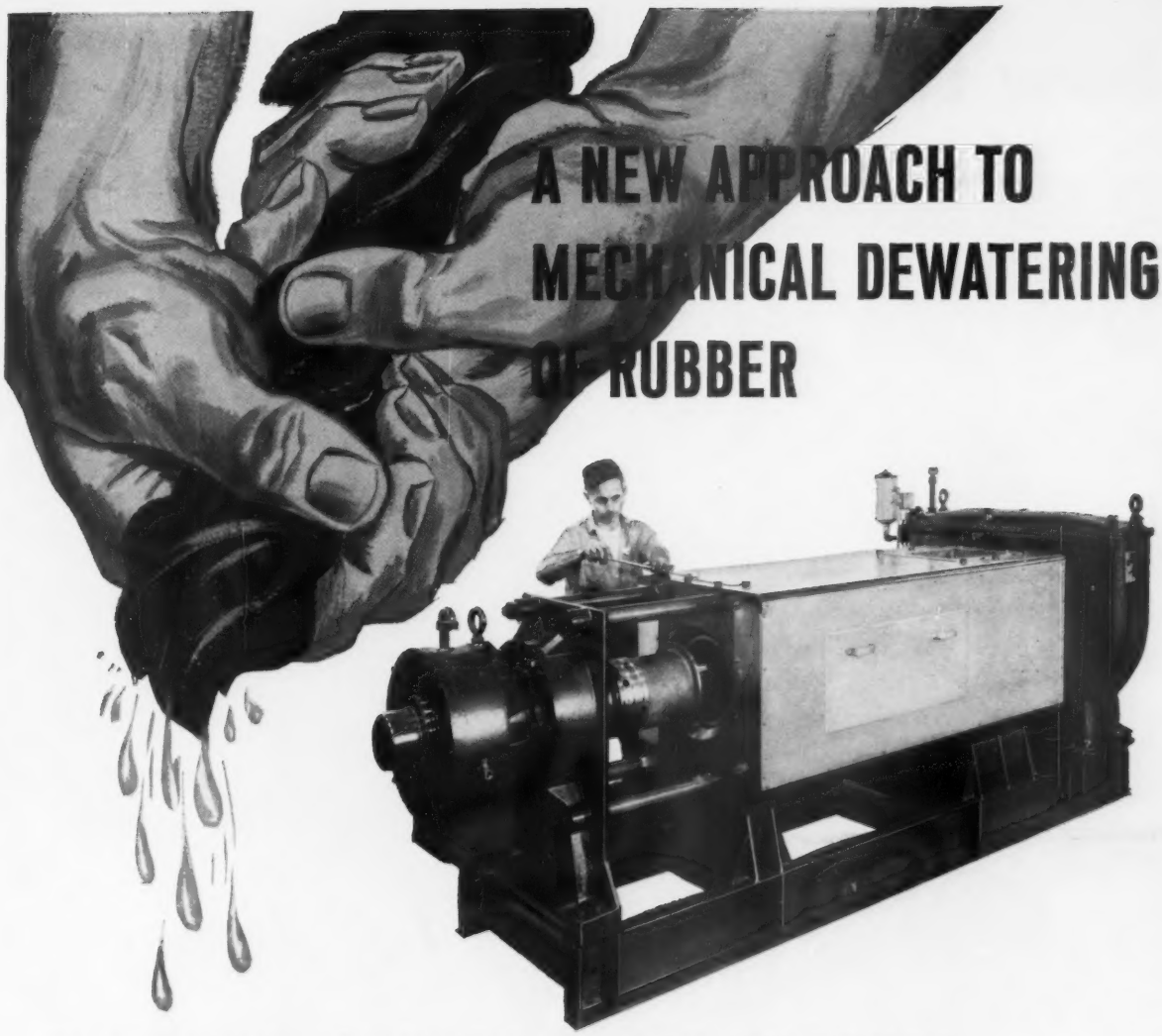
NATURAL RUBBER
A PRODUCT OF NATURE plus SCIENCE

TECHNICAL SERVICE DIVISION

NATURAL RUBBER BUREAU

1108 16th Street, N.W.
WASHINGTON 6, D. C.

* PA 80 rubber is produced on far eastern estates under license from the Rubber Research Institute of Malaya and is marketed in the form of 100 lb. blocks wrapped in polythene and packed in multiwall paper bags for ease of handling and good stacking in warehouse and factory.



EXPELLER* DEWATERING PROCESS

Mechanical dewatering of rubber by the new Expeller process has aroused the interest of many rubber companies. Following years of research the process has now been industrially accepted and in use for over a year. In fact, major companies are now using a number of these Expellers, preceeding dryers, to take moisture in crumb from 65% to as low as 8%. In actual use, the capacity of drying equipment can be increased two to four times when preceded by an Anderson Expeller. Based on such performance, each of these companies have ordered additional units.

EXPELLER DEWATERING HAS THESE ADVANTAGES

- Increases Drying Capacity
- Agglomerates Minute Crumb particles
- Improves Carbon Dispersion
- Saves on Drying Equipment
- Reduces Dryer Dust
- Dewaters all Types of Natural or Synthetic Rubber

A Pilot Plant in the Anderson Laboratory has dewatered almost every type of synthetic and natural rubber by this Expeller process with excellent results. These data are available to rubber companies. Pilot Plant demonstrations on your product can be arranged.

*Trademarks reg. in U. S. Pat. off & Foreign Countries

THE V. D. ANDERSON COMPANY
1963 West 96th Street • Cleveland 2, Ohio

Gentlemen: We are interested in the Expeller Rubber Dewatering Process. Would you please provide us with additional data.

We are processing (type of synthetic or natural rubber) _____

_____

Name _____ *Title* _____

Company Name _____

Address _____ *City* _____ *State* _____

THE V. D. ANDERSON COMPANY
Division of International Basic Economy Corporation

how to vastly increase the useful life of rubber...

Effect of Curing System on Antiozonant Retention in SBR Stocks after Vulcanization

(All contain 3.0 phr UOP 88; 40.0 phr HAF black)

Compound	Accelerator	Sulfur, phr	% Extractable Antiozonant
1082....	2.0 phr benzothiazyl disulfide	2.0	66.4
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1087....	None	2.0	~100.0
1088....	1.0 phr benzothiazyl disulfide	3.0	74.6
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1089....	1.0 phr benzothiazyl disulfide	1.0	88.6
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1084....	1.0 phr N-cyclohexyl-2-benzothiazole sulfenamide	—	—
1093....	1.0 phr diphenylguanidine	2.0	~18.0
1085....	2.0 phr tetramethylthiuram disulfide	—	35.0
1090....	4.0 phr tetramethylthiuram disulfide	—	12.9

The SBR specimens below were exposed to ozone at 100°F with 20 percent elongation for 52 hr. at 33 pphm ozone, then 187 hr. at 63 pphm ozone.

Carbon black—HAF (high abrasion furnace), Curing system—4 phr tetramethylthiuram disulfide; Hours to first crack—7 to 23.

Carbon black—HAF (high abrasion furnace), Curing system—2 phr sulfur, 1 phr N-cyclohexyl-2-benzothiazole sulfenamide. No cracks in 239 hr.

CONSIDER THE EFFECT OF YOUR CURING SYSTEM ON THE EFFECTIVENESS OF A CHEMICAL ANTIOZONANT

In compounding rubber, there are several things which are important in assuring maximum crack-free life. First, you must use a potent antiozonant like UOP 88 or 288. Next, consider what a vast difference in effectiveness can be realized by your *curing system.*

The right antiozonant used in correct proportion is of primary importance. Then, by using the proper accelerator, you can promote its maximum effectiveness, and thus contribute to maximum ozone protection.

Look at the two rubber test strips illustrated. Both were formulated with UOP 88 .... but note how much more effectively the antiozonant worked when accompanied by this change in curing systems—a vast increase in resistance to cracking. The table above the test strips shows how the *proper* accelerator aids antiozonant effectiveness.

Help in achieving maximum effectiveness from UOP 88 or 288 antiozonants in your rubber formulations is available through UOP facilities and technical personnel. Just write or telephone our Products Department.

WHERE RESEARCH TODAY MEANS PROGRESS TOMORROW

UOP®

UNIVERSAL OIL PRODUCTS COMPANY

30 Algonquin Road,
Des Plaines, Illinois, U. S. A.

UOP ozone cabinets provide test conditions at a wide range of ozone concentrations.

NOW IN COMMERCIAL PRODUCTION AN IMPORTANT NEW POLYMER

ENJAY BUTYL HT 10-66

New Enjay Butyl HT 10-66 (formerly MD-551) is an elastomeric isobutylene-isoprene copolymer containing reactive chlorine. New HT 10-66 can be cross-linked by a variety of conventional and novel vulcanizing techniques, using either the carbon-to-carbon double bonds or the reactive chlorine, or both. Vulcanization of HT 10-66 is usually more rapid than unhalogenated Butyl polymers. Vulcanizates show the same inertness to environmental attack characteristic of Enjay Butyl rubber. Stable cures make HT 10-66 especially suitable for service at high temperatures.

NEW ENJAY BUTYL HT 10-66 OFFERS:

- *Covulcanization with other elastomers*
- *Fast cure rate*
- *Sensitivity to a wide variety of cure systems.*
- *Non-toxic cure systems*
- *Excellent low compression set character*
- *Exceptional heat aging properties*

. . . PLUS THESE WELL-KNOWN PROPERTIES OF BUTYL:

- Good flex and abrasion resistance
- High tear strength
- Resistance to chemicals
- Low permeability
- Resistance to aging, ozone and oxidation

For more information, write Room 1222, Enjay Chemical Company, 15 West 51st Street, New York 19, New York

ENJAY® BUTYL

EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

• **Michelin organizes Swiss holding company.** The well-known French tire manufacturer has organized, in cooperation with the Schweizerische Kreditanstalt, Zurich, a holding company "Compagnie Financiere Michelin, Basle" with a capital of about $75 million. The holding company will control all commercial establishments of Michelin in Europe and in Africa. Furthermore, it will acquire the European factories and production facilities overseas including Michelin-Reifenwerke AG, Karlsruhe; Nederland'sche Banden Industrie Michelin; S.A. Michelin Italia, Turin; two British Michelin branches; a Spanish division and the recently established factory in Saigon, Viet Nam. The Michelin group owns more than 50 per cent of the shares of the automobile factories of Citroen and about 22 per cent of the shares of a new synthetic rubber factory.

• **Dunlopillo GmbH Hanau, West Germany, extends product line.** This company, belonging to the International Dunlop Group, is extending its product line. In addition to foam rubber products, it will also manufacture polyethylene foam mattresses in various thicknesses and grades, and special cushions for the carpet industry. Pillows made of foam rubber and polyethylene foam will be supplied to railroads, automobile manufacturers, and furniture industries.

• **German tires last too long?** The president of the Association of German Recappers has complained that the German tire industry is manufacturing tires which last too long. The president said that a number of recapping facilities are idle because the new German tires are too well made and do not require frequent recapping. For this reason, the association has requested the German tire industry to establish maximum wearing standards for the tires, so that the tires will last for only a certain amount of mileage. The German tire industry has protested against this request and has pointed out that in view of foreign competition the German tire manufacturers are compelled to produce a quality which is equal to the international standards.

• **Who finances export orders?** The Export-Import Bank of Washington approved 712 loans and guarantees amounting to $897 million in 99 countries in 1960. The loans will assure the financing of nearly 73,000 individual export orders with a total invoice value of $958 million.

Since last May the bank entered the short-term (up to 180 days) field of export activity by making a system of political risk guarantees available to U.S. shippers. This type of assistance is available for small and large transactions. The smallest medium-term credit authorized by the Bank during 1960 was for $2,100 to assist in financing the sale of photo-engraving equipment to a buyer in Argentina. Approximately half of the medium-term credits and guarantees authorized at the request of U.S. exporters were each for less than $50,000.

Credits and guarantees can also be extended from one to five years for the sale of capital equipment, including such items as machinery, heavy automotive vehicles, machine tools and a wide variety of industrial items.

The standard formula for financing capital equipment on medium-terms includes the requirement of a payment by the foreign buyer of at least 20 per cent of the purchase price before delivery of the product. Of the balance, the U.S. supplier carries 15 per cent for his own account and the Export-Import Bank finances 85 per cent without recourse on the exporter.

In view of the fact that our competitors are offering a variety of credits to many countries in the world, it is imperative that the U.S. manufacturers and exporters are informed about the possibilities on how to compete with the terms offered by suppliers in foreign countries. A letter to the Export-Import Bank, 811 Vermont Ave., N.W., Washington 25, D. C., will bring the required details.

• **Firestone French tire plant to open.** Production at Firestone's new tire plant in Bethune, France, is scheduled to begin this April. The new facility will be the company's sixth tire plant in Europe, but the first in France. It is one of the two facilities Firestone is building in France. The other, a synthetic rubber plant at Port Jerome, will be completed in the fall of 1961. The synthetic plant will produce Diene, an extender developed by Firestone which is blended with and improves the quality of natural rubber in tire production.

The Bethune plant will have the largest initial capacity of any of Firestone's foreign tire plants, according to J. E. Trainer, executive vice-president of the company. He said it will compare in size with Firestone's tire plant at Pratteln, Switzerland, and will be larger than the company's tire plants at Alcochete, Portugal; Bilbao, Spain; and Viskafors, Sweden.

1961 FEBRUARY 1961

SUN	MON	TUE	WED	THU	FRI	SAT
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26	27	28				

1961 MARCH 1961

SUN	MON	TUE	WED	THU	FRI	SAT
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1961 APRIL 1961

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1961 MAY 1961

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28	29	30	31			

1961 JUNE 1961

SUN	MON	TUE	WED	THU	FRI	SAT
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1961 JULY 1961

SUN	MON	TUE	WED	THU	FRI	SAT
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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23/30	24/31	25	26	27	28	29

Make the SIX-MONTHS test

Use the handy chart above to find out whether you're being neglected.
Just record for the next six months the number of months that the current issue of RUBBER AGE does ***not*** reach your desk within 72 hours after the nominal publication date circled.
If this happens more than once, you're being neglected!

The remedy? Simple.
A personal subscription, sent to your home, with no one else ahead of you on the list to read it unless your wife develops the habit.
Clip, cut out, tear up, read and re-read just as long as you want.
Sheer luxury, that's what it is.
And only $5, too. And it's tax deductible, to boot!

Mail the coupon below. We'll do the rest.

RUBBER AGE 101 West 31st St., New York 1, N. Y.

Date .....

OK, Rubber Age, I'm tired of waiting months for copies to reach my desk.
Start the luxury service now. Here's my $5* for a year's subscription.

Name ..... Title .....

Home Address .....

City ..... Zone ..... State .....

Company's Name (For our records only) .....

Company's Major Products .....

(*) Canada, $5.50, All Other, $6

R 261

TEXAS
CARBON BLACKS

"On calendering quality we can compete with anyone in the world"

—says Ellay Rubber Company, Inc.

As an acknowledged leader in the manufacture of continuous vinyl film and sheet, Ellay Rubber Company knows calendering . . . and knows what fine calendering can do to improve the quality of plastics products. That's why, when recently selecting a new machine for their plant in Los Angeles, the choice was Farrel.

The largest plastics calender west of the Rockies, it has four 28″ x 72″ rolls in an inverted "L" arrangement. The top roll is preloaded and the bottom roll is equipped for roll crossing. The rolls are drilled for close temperature control.

The calender has a range from .0019″ to .020″ and is complete with motorized pick-off roll, embosser, cooling rolls, trimmer and winder.

Discover for yourself what Ellay and other leading manufacturers have found to be the many quality advantages of Farrel calenders. Send for bulletin 174-A.

FARREL®

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Akron, Chicago, Los Angeles, Houston, Atlanta
European Office: Piazza della Republica 32, Milano, Italy

FB-1209

BLACK MAGIC???

**WHO SAYS
YOU CAN'T SOLVE
ALL YOUR
CARBON BLACK PROBLEMS
BY PULLING
A NAME OUT OF A HAT?**

BLACK

MAGIC???

WHO SAYS
YOU CAN'T SOLVE
ALL YOUR
CARBON BLACK PROBLEMS
BY PULLING
A NAME OUT OF A HAT?

BLACK MAGIC???

WHO SAYS
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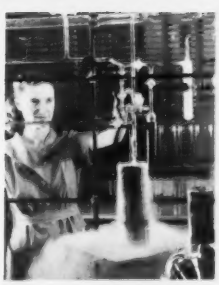
- Not just more facilities — but the very best facilities for production and quality control to assure the same uncompromising level of quality the world over. And Cabot's non-stop programs of research and development provide continuing assurance that you are buying the very finest carbon black available.
- Better technical service — Cabot offers the convenience of a highly trained technical staff — world-wide — to help you find fast, economical solutions to your carbon black problems wherever you may be.
- No magic to it. All you have to do is pick up your phone and get in touch with the nearest Cabot man. He'll be happy to provide you with complete information.



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Printed in U.S.A. February 1961

As Ken Soule Sees It

by Kenneth J. Soule

Rolling Along

A new and distinctly novel approach to the problem of the nation's overcrowded highways was recently unveiled by the Westinghouse Electric Corp. before the highway research board of the National Academy of Sciences in Washington, D.C.

As described by Lewis Lapham in the *New York Herald Tribune*, the plan envisions an entirely automatic highway system linking Boston, New York, Philadelphia, Washington, Pittsburgh, St. Louis, Chicago, (and way points) in a 3,000-mile set-up. The roadway itself would consist of three main parts —(1) a series of rubber roller units (somewhat resembling inverted, oversize roller skates)—(2) the carrier units, which would be flat-bottomed, and in general would look like a streamlined, articulated ten car subway train, and (3) the metal guard rails stretching continuously along both sides of the entire system, to keep the speeding carriers in place. The rubber roller units would be built on the ground at intervals of about 20 feet and each would be driven by individual motors. The rollers would support and propel the carrier units, at speeds up to 150 miles per hour. Each carrier would be designed to hold ten automobiles, and would also have rest rooms and a lounge.

According to Charles Kerr, Jr., the Westinghouse engineer who masterminded the plan, the system—including loading and unloading—would be operated entirely by remote control and would be "completely free from the possibility of human error." It is also claimed that there would be no delays or stoppages due to snow, rain, fog, ice, or any other sort of bad weather.

One might be forgiven for having a little skepticism as to the claimed perfection and infallibility of the system. Even if the entire operation is handled by punched cards, or some similar device, it is not impossible that the master cards could be improperly made out. However, this is a minor matter. The conception in general sounds most intriguing, and it is to be hoped it will be pushed vigorously. Motorists should love it! Metal fabricators, electrical companies and rubber manufacturers could surely use the resulting new business.

So, let's go!

Automotive Antifreezes

At the time of this writing, the 1960-61 winter season is still very much with us. Nevertheless, it is perhaps not too early to take a quick look at the impact made on antifreeze sales by several new entries into the field this season.

As reported by *Chemical and Engineering News*, the total sales of all antifreeze products in 1960 will probably be around 125 million gallons. This is about 2 per cent higher than in 1959. The split-up between the three types of material used is (1) methanol—7½ per cent; (2) new antifreezes—5 per cent; (3) regular ethylene glycol—87½ per cent. For purposes of comparison, the figures for 1955 were as follows: total consumption, 100 million gallons, of which about 29 per cent was methanol and the rest ethylene glycol.

With regard to the new, highly publicized radiator coolants, it is obvious that they did not make much of an impact on this year's antifreeze market. This is no doubt because car owners were quite confused by the varying claims and the divergent recommendations made by and for the new products. As a result, the bulk of these potential customers continued to use the brand of antifreeze which they had previously found satisfactory.

This "hide-bound" behavior must have been at least mildly disappointing to such firms as Dow, and Du Pont. The former is said to have spent about $4.5 million on sales and promotion for Dowgard, while similar expenditures by DuPont for Telar approximated $6 million. Of course, the hope of the proponents of the year-round coolants is that progress next year will be much more rapid, now that a good ground work has been laid with dealers, service men and the public in general. It is felt that new advertising designed to emphasize the advantages and clear up any still-existing confusion about specific points of each grade of coolant should result in greatly increased customer acceptance. Let's make a note to check up about a year from now and see how the production and sales jibe with these predictions.

Culinary Note!

Leave it to the French to introduce something novel and intriguing in the gastronomical department. But this time the item is not a food, as such. It is a cooking utensil which is said to make life easier for the harried housewife. It also assists greatly in presenting fine fried foods on the table in more beautiful and therefore more palatable form.

As outlined in the *N. Y. Herald Tribune*, the new gadget is a fry-pan called, T-Cal. The body is of aluminum, but the lining-the-cooking surface is of

Dupont Teflon, to which foods such as eggs, fried potatoes, fried chicken, etc., do not adhere, even when little or no fat is used. The pan is readily cleaned, with only a minimum of rubbing with a dish cloth, using warm soapy water. Scouring is not needed and in fact is warned against for fear of scratching the plastic surface.

It is said that the new work-saving pan has been in successful use in France for about four years, and during the past year has been well received in spot-tests in this country. According to the newspaper account the T-Cal fry pan is now available in Macy's housewares department for "under seven dollars," (presumably for the 10-inch size).

It is not clear why this Teflon lined item had to be born, or at least reared in France. Perhaps on the theory that foreign glamour helps to sell everything, even frying pans . . . In any case, if food cooked in it looks better, tastes more delicious, and the pan practically takes care of itself, we shall gladly join the *Vive la France* chorus!

Pearls

Pearls, in common with many other precious and semi-precious gems, tend to be surrounded with an aura of glamour and mystery. In the case of natural pearls, this is rather easily understood, because of their matchless, muted loveliness. Although it is quite well known how pearls are slowly and laboriously formed inside the shells of oysters and other bivalves, there is still much uncertainty and confusion as to the how and why of this operation and why even well-established oyster beds fluctuate so widely in size and productivity.

A specific case in point is the area in the Gulf of Manaar, at the southern tip of India, which many years ago was the source of a very lucrative supply of pearl oysters. The advent and acceptance of cultured pearls, and changes in the beds themselves, caused the commerce in these natural gems to fall off sharply! Now, however, the trend back to natural pearls plus marked increases in available pearl oysters in the area have brought about important activity, particularly along scientific lines. One facet of this work is the study now in progress under the active guidance of Dr. Francesco Baschieri-Salvadori, an expert skin diver and widely experienced Italian marine biologist.

As Kathleen McLaughlin—writing in the *New York Times* under a United Nations, N. Y., date line—explains it, the government of India is sponsoring the current studies, begun in 1959, which will continue for a number of years. The work involves charting all available beds in the vicinity as well as rechecking previously surveyed areas to determine as accurately as possible the probable potentials as far as pearls are concerned. Time is of the essence in the investigation since it is only during February, March, and April that the sea is calm enough to permit divers to make their underwater studies. In the old days divers could only remain submerged for very short periods, perhaps a minute at a time. With the advent of rubber masks, water lungs, fins, etc., this aspect of the problem has been greatly improved. Pearl diving is still extremely dangerous however, even without the added hazard of poisonous snakes which, it is said, occasionally frequent these India waters. When indications point to the possibility of such unwelcome visitors, rubber diving suits are worn for added protection.

In addition to surveying the oyster beds, Dr. Baschieri-Salvadori and company are charting the chank beds which yield a large, white spiral shell, sacred in the Hindu religion. The shells are processed into rings and various other types of jewelry worn by Bengalese women. They are also used as ornamental decorations in the headbands of the venerated Hindu cows. It is said that about a million chank shells are harvested each year during the three-month period beginning with November. They are sold directly to the government for 8 annas, or approximatey 11 cents per shell, U.S. currency.

Anchors Aweigh (continued)

We offer below some additional data to supplement that given in the December, 1960, issue of RUBBER AGE, regarding the reconstruction and rehabilitation now in progress on the U.S. Navy's first warship—the frigate *Constellation.*

An interesting sidelight of the "Operation Constellation," is the fact that many of the major repair parts, such as planks, beams, etc., are being signed and dated by the highly-skilled artisans who do the work. This is a continuation of a practice followed since Colonial times in wooden ship building, or overhauling. Incidentally, this has proved invaluable in establishing back history of the Constellation and other famous vessels.

A major obstacle in the way of more rapid progress in the work is lack of money! Practically all of the cash being used comes from contributions by Navy men, and other well wishers. To supplement the restoration fund, the committee has provided medals made from copper spikes removed from the ship's old timbers. These are being sent to each person contributing $1. The detail work in this connection is being handled on his own time by Chief Petty Officer C. A. Malin in Baltimore, Md., purely to keep the project moving. All contributions go directly to the restoration fund—none for money-raising expenses.

If you would like to help this patriotic project, send your contributions of $1.00 (or more), to *"Constellation," Baltimore, Maryland.* Please, do it now, before it slips your mind!

By the way, the Committee is *very* broad minded, and will accept money from the Army, Air Force, and Marines, as well as from Navy people. Civilian money is also welcome. The copper-spike medals you will receive will surely be cherished by your youngsters, and will also serve as life time, free admission passes to the Constellation, when it goes on tour, probably late this year.

Dr. Stanley Jankowski, one of Neville's senior chemists, is shown here holding a test chart showing the results of tensile testing three aged rubber samples. The chart is just as it came from the Instron Tester, except that scribe lines have been inked over and labeled for visability in the picture. They have not been changed. From left to right, samples contained Neville's R-16 Coumarone-Indene Resin, competitive resin A and competitive resin B. Detailed results are shown below.

Competitive tensile test shows Neville Resin superior

Neville's R-16 Coumarone-Indene Resin was matched against two other leading resins in a neutral colored SBR test recipe compounded for comparative analysis. The results were as follows:

	Average Tensile	Aged Average Tensile	% Tensile Retention
Neville's R-16	1830 psi	1400 psi	76.5
Competitor A	1680 psi	1150 psi	68.5
Competitor B	1655 psi	1275 psi	77.2

Beyond superior tensile strength, there are other benefits derived from compounding rubber with R-16 Neville Resin. Elongation, both before and after aging, is exceptional and considerable aid to processing is enjoyed. Better mold flow and easier dispersion of fillers are also realized in using R-16 Neville Resin. Use the coupon to write for further information.

Resins—Coumarone-Indene, Heat Reactive, Phenol Modified Coumarone-Indene, Petroleum, Styrenated, Alkylated Phenol • **Oils**—Shingle Stain, Neutral, Plasticizing, Rubber Reclaiming • **Solvents**—2-50-W Hi-Flash*, Wire Enamel Thinners, Nevsolv* • **High Purity Indene.**

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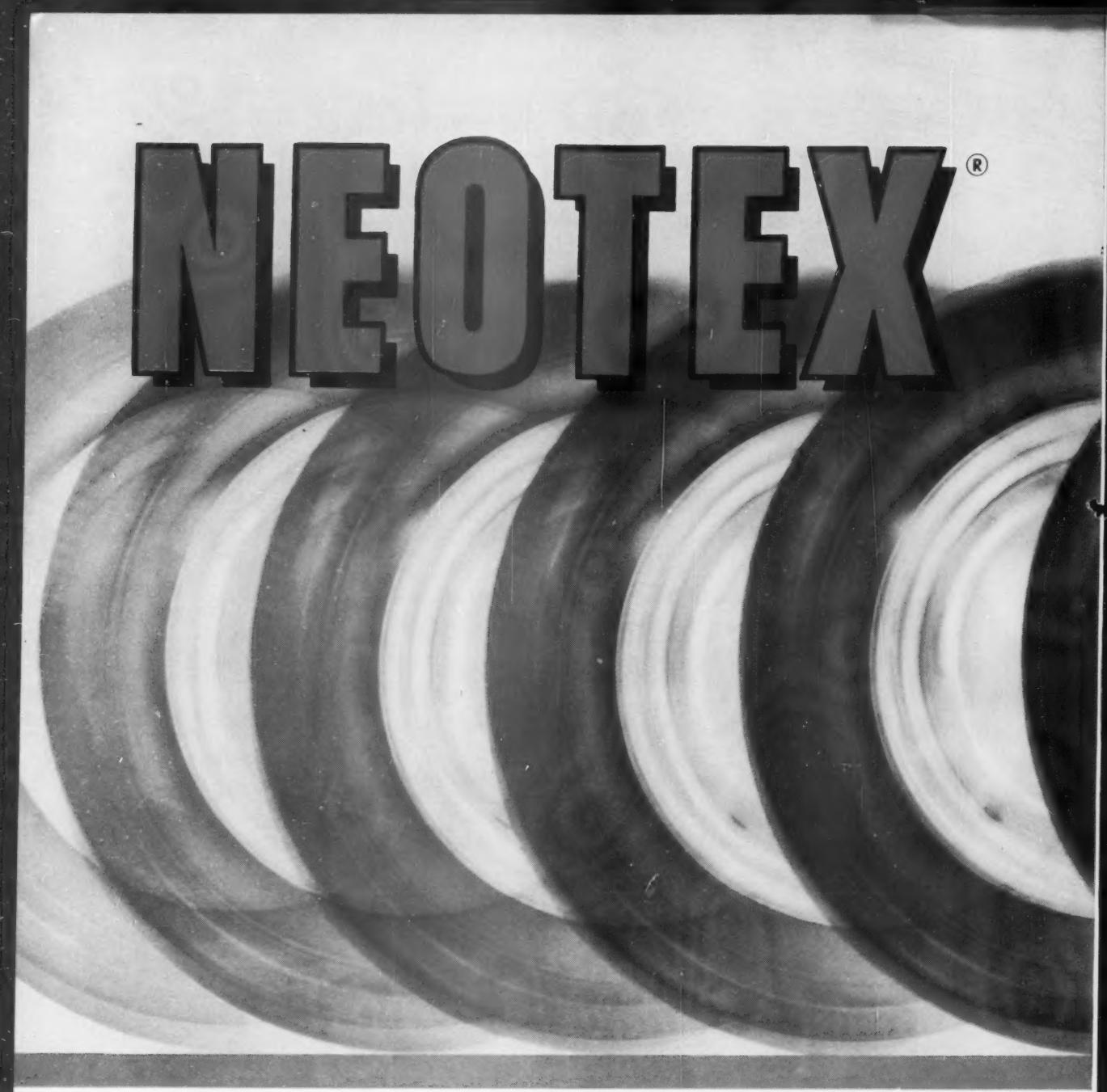

Industry asked for a softer ride . .

NEOTEX 100
...in the HAF fineness range...develops low modulus...for use in carcass stocks, natural rubber treads, high grade mechanicals, etc. Now being used as a Channel replacement.

NEOTEX 130
... in the ISAF range . . . develops low modulus, good tensiles, high elongation and lower Shore Hardness . . . for improved ride in passenger tires.

NEOTEX 150
. . . in the SAF range . . . produces highest tensiles of any rubber carbon . . . gives best ride-noise-tread wear combination . . . tailor-made for the Black Rubber process.

S-1

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City.....Zone.....State.....

. . less noise . . . good wear:

COLUMBIAN DID IT!

Once again, with the development of the NEOTEX series, Columbian has led the way for finer-quality products, both in tires and industrial rubber goods. Through NEOTEX, the compounder can get oil furnace blacks that provide high tensile, low modulus and low hardness. And now, with the *immediate availability* of NEOTEX, you have the quality carbon black you asked for: good wear, less noise, softer ride. Contact your Columbian representative . . . and send off the coupon for the whole story . . . *today*!

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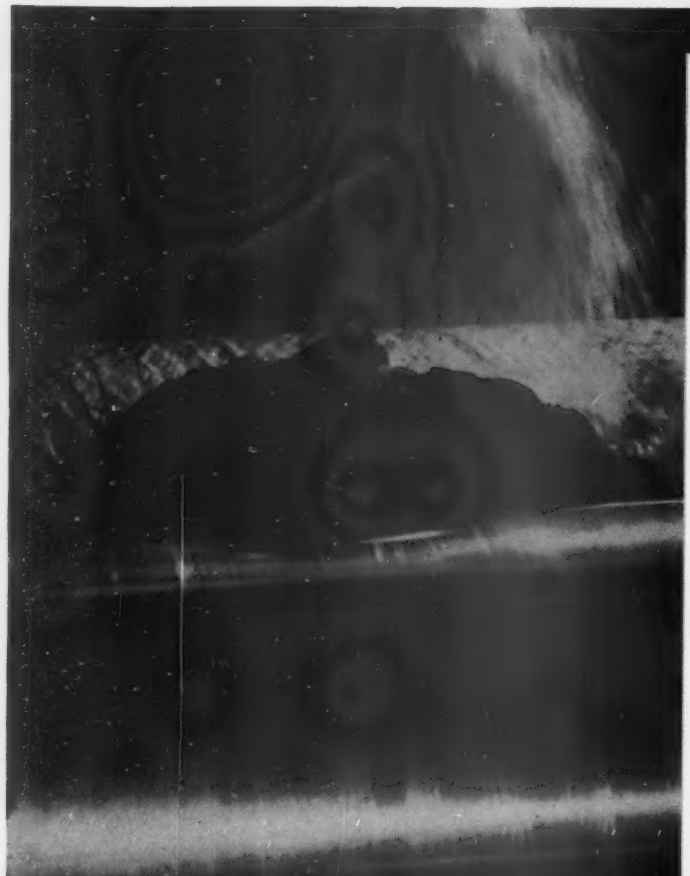

see Pennsalt for rubber chemicals

ACCELERATORS AND VULCANIZING AGENTS

METHYL THIRAM, ETHYL THIRAM—Versatile primary accelerators, activators, vulcanizing agents for Hevea, SBR, nitrile, butyl rubber. Retarders for Neoprene GN.

METHYL ZIRAM, ETHYL ZIRAM, BUTYL ZIRAM—Active ultra accelerators and activators for Hevea, SBR and nitrile, especially for latex and wire compounds.

ETHYL SELERAM—Extremely active ultra accelerator for continuous vulcanization wire compounds and butyl rubber.

ETHYLAC®—Primary accelerator for Hevea, SBR and nitrile compounds. Provides good scorch time and rapid vulcanization. Excellent delayed action activator for thiazoles and sulfenamides, in both Hevea and SBR compounds.

DIPAC®—Sulfenamide-type primary accelerator for natural and SBR rubber. Exceptionally long delayed action followed by rapid vulcanization.

VULTAC®—Vulcanizing agents and resinous-type plasticizers for a variety of Hevea, SBR, nitrile and Hevea-SBR blend compounds.

ANTIOXIDANTS

PENNOX® A—Alkylated diphenylamine general purpose antioxidant for dry rubber and latex.

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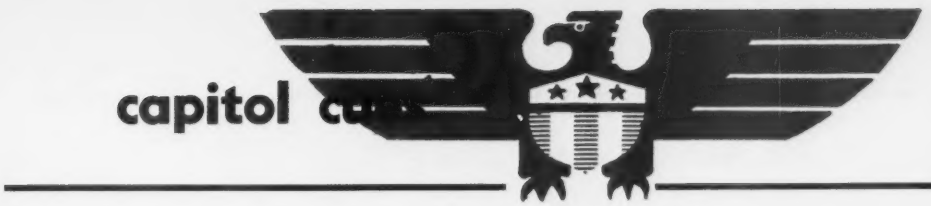


KENNEDY WILL GET MOST OF WHAT HE WANTS FROM CONGRESS this year. For one thing, he's likely to have at least a taste of the honeymoon a Congress usually accords to a new President. For another, he isn't asking for a very extensive program--at the outset, anyway. He still has every intention of making good on his campaign promises, but he'll move with deliberate speed.

Why does he feel he must proceed so slowly? Three reasons:
-The narrowness of his victory over Nixon. Congress seems to be impressed by the fact that so many folks picked the GOP.
-The GOP-Southern Democratic coalition. There are definite signs that it will be very much alive and kicking this year.
-Eisenhower's Budget for fiscal 1962--starting on next July 1. Kennedy just cannot rewrite the entire document this Spring. He'll have to concentrate on revising a relatively few items.

KENNEDY'S PROGRAMS WILL PIERCE IKE'S BUDGET LIMIT by several billions of dollars. Eisenhower's efforts to keep the Budget close to balance don't look very promising to begin with. Spending is already on the uptrend, and soft business is cutting corporate profits--and tax payments. So, red ink of $2 or $3 billion was estimated unofficially even before Kennedy took over.

The new President's top-priority programs for 1961 will expand this deficit...perhaps by another $2 billion or so. All told, the federal government's red ink could top $5 billion in '62.

SOME KENNEDY ADVISERS TALK OF AN INCOME-TAX CUT for individuals as an anti-recession action...thus increasing the size of the deficit further. But they would recommend this only if the decline gets a lot more serious, something now considered very unlikely. (They want the deficit kept small.)

There's a good chance for certain lesser tax changes in 1961 of principal concern and benefit to smaller business firms.
-A special exemption for profits reinvested would spur growth. Small companies could deduct 20%...up to $30,000 each year.
-Payments to private retirement plans would be tax deductible, under the oft-presented Keogh bill, which has much support.
-Applying fast write-off rates to used items would be allowed. Now only brand-new equipment comes under the fast formulas.

NOW, LET'S LOOK AT KENNEDY'S 5-POINT PRIORITY LIST and its prospects. (These are the programs he and Congressional leaders listed last December.) It will constitute first delivery on the campaign promises made last Fall. As noted, Kennedy will get most of this program enacted...but not all of it.

START WITH PLANS FOR MEDICAL CARE FOR THE AGED under Social Security. Kennedy backed this scheme in the last Congress, but it was finally beaten. He talked about it a lot in the campaign and attacked Ike's moderate stand. He still wants to give those over 65 "free" care, paid with payroll taxes.

capitol cues (cont'd)

Kennedy will have a fairly rough time getting his own version voted into law. Some members of his own party oppose the idea. For one thing, they say, it won't help folks not now covered by the System. Some of these opponents occupy seats on the powerful Senate Finance Committee. This puts them in position to block the Kennedy bill...or to scale it way down.

AID TO EDUCATION WILL GIVE KENNEDY TROUBLE of roughly the same kind. His party will give him plenty of support on money for building classrooms. Indeed, a number of liberal Republicans will go along with this program. They'll debate the amount of money...but both parties back the principle. The big tussle will come over U.S. funds for paying salaries of teachers. On this issue, Kennedy will lose some of his backing...GOP and Democratic.

KENNEDY'S PROGRAM FOR FEDERAL AID TO HOUSING will have clear sailing. It will probably call for a large appropriation to finance mortgage-buying. But, despite the cost, Republicans will join Democrats in voting for it. This has come to be regarded as a standard way of spurring home-building, especially useful in a recession. It was used by the old Administration.

ASSISTANCE TO DEPRESSED AREAS WILL ALSO HAVE AN EASY TIME in Congress. Kennedy committed himself to a program while campaigning in West Virginia. Besides, the troubles of pockets of chronic unemployment are now recognized widely as a national problem. In fact, Congress twice passed such a bill. But it bumped into a Presidential veto both times...on grounds of economy. With the new President backing the bill, the result will now be different.

Here's the kind of assistance Congress will be considering:
- Federal loans to cities for building sewers, waterworks, and factories to enable them to attract new kinds of industries.
- Retraining grants to the jobless displaced by technological change to help them locate employment in other localities.

A HIKE IN THE MINIMUM WAGE IS THE LAST ITEM on Kennedy's priority list. This, too, came near to passage last year. But it foundered over the amount. Labor plugged for a raise from $1 to $1.25 an hour. The Administration held out for $1.15. So the question became a campaign issue, slanted toward labor. This year, Kennedy's support will be a big plus factor for the higher figure.

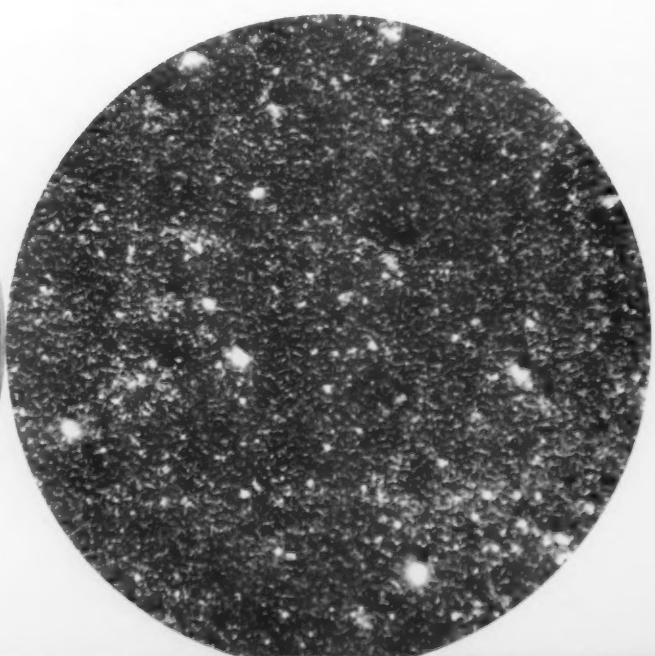
CONGRESS, OF COURSE, WILL TAKE UP OTHER ITEMS of legislation this year. What they'll be, though, will depend heavily on developments in the economy and on how the new Kennedy Administration and Congress size up each other. If Kennedy continues to exhibit his post-election realism and moderation, he will exercise substantial influence and leadership over the lawmakers.

KENNEDY WILL PROBABLY GET BEHIND TWO LABOR BILLS, later in the year. Neither one, though, is likely to arouse much enthusiasm among businessmen. Higher federal standards for unemployment insurance now paid by the states is one measure. It will assume greater importance as joblessness grows. But industry must pay the cost of larger, longer benefits...through taxes. Legalization of picketing against a single contractor...at a site on which several are working...is another bill Kennedy will back. It may well pass. The prospects of strike-abating legislation are still very hard to figure. Compulsory arbitration has little chance. The unions don't want to see it.

TIRES LAST LONGER
WHEN THEY'RE MADE WITH AMERIPOL
MICRO-BLACK
HERE'S WHY...

BETTER CARBON BLACK DISPERSION, MORE ABRASION RESISTANCE WITH AMERIPOL MICRO-BLACK ...THAT'S WHY TIRES LAST LONGER

Illustration 1—Photomicrograph below shows Ameripol 4659, a high dispersion Micro-Black containing 52 parts HAF carbon black. Note how thoroughly and uniformly the black is dispersed in the rubber.



Compare the uniformity of carbon black dispersion in Micro-Black (illustration 1, extreme left) with a counterpart formula, dry-mixed (illustration 2) and a slurry-mixed black masterbatch (illustration 3).

Micro-Black's micron-size particles are thoroughly dispersed in the rubber by an exclusive process—high liquid shear agitation at the latex stage. Result: tires and other products made with Micro-Black have controlled uniformity, superior dispersion, and greater abrasion resistance.

Photomicrographs shown here were made by Dr. Raymond P. Allen of Akron, Ohio, well-known Consultant in Industrial Microscopy. They are certified to be exactly as shown (100 times magnification) and unretouched.

CHOOSE AMERIPOL MICRO-BLACK FOR YOUR RECIPES AND YOU GET NOT ONLY A BETTER END PRODUCT, BUT ALSO:

Savings in time—Since the black is already in the rubber, you eliminate one weighing operation, one mixing operation, and shorten other mixing operations.

Savings in equipment—Elimination of the carbon mixing operation frees equipment for other uses and makes possible increased production without additional investment.

Savings in power—Fewer mixing operations, plus shorter mixing cycles, mean lower power consumption for the same volume of production.

Savings in inventory costs—You purchase and handle only one material—Micro-Black—instead of two—rubber and carbon black. And you need no extra storage space for carbon black, since it's already in the rubber.

Illustration 2—A conventional dry mix masterbatch containing 52 parts HAF carbon black.

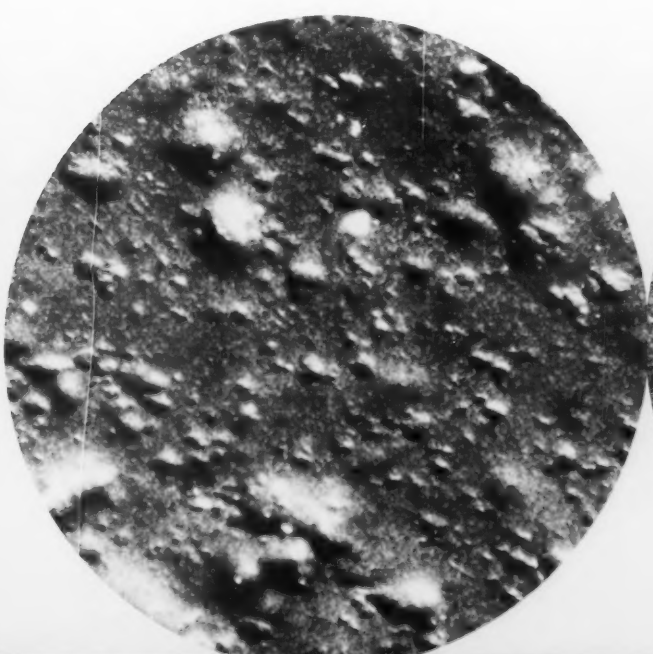
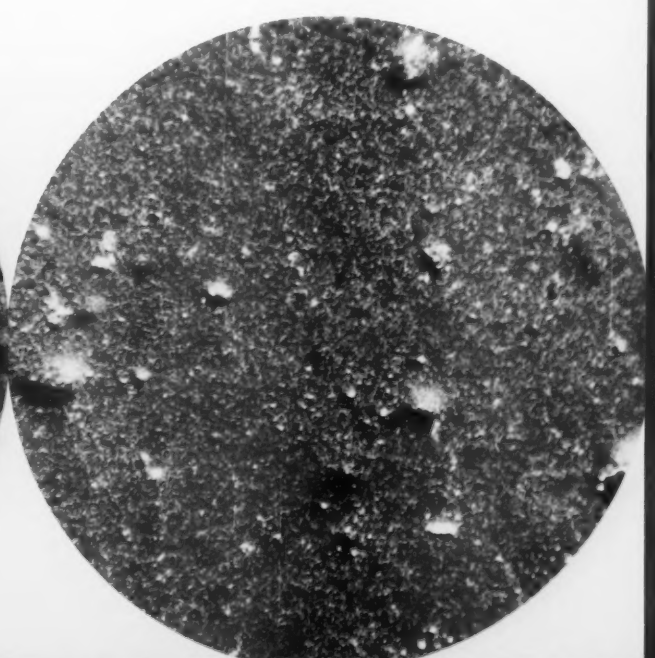


Illustration 3—A black masterbatch containing 52 parts HAF carbon black, mixed by competitive slurry method.



NOW AVAILABLE ...13 TYPES OF AMERIPOL MICRO-BLACK

Whether you're making tires or any other rubber products, you'll find the right masterbatch to meet your requirements in the complete Micro-Black line.

COLD MICRO-BLACK	BLACK		OIL		Emulsifier	Stabilizer
	Type	Parts	Type	Parts		
1605	FEF	50	—	—	FA	NS
4651	HAF	62.5	HP	12	RA	ST
4659	HAF	52	HA	10	RA	ST
4660	ISAF	52	HA	10	RA	ST
4664	ISAF	52	HA	12.5	RA	ST
4667	SAF	40	HA	5	RA	ST

COLD, OIL MICRO-BLACK	BLACK		OIL		Emulsifier	Stabilizer
	Type	Parts	Type	Parts		
1805	HAF	75	N	37.5	FA	NS
1808	HAF	75	HA	50	MA	ST
1809	HAF	75	HA	37.5	MA	ST
4756	HAF	75	A	37.5	MA	ST
4758	ISAF	82.5	HA	62.5	MA	ST
4759	ISAF	75	A	37.5	MA	ST
4761	SAF	65	A	37.5	MA	ST

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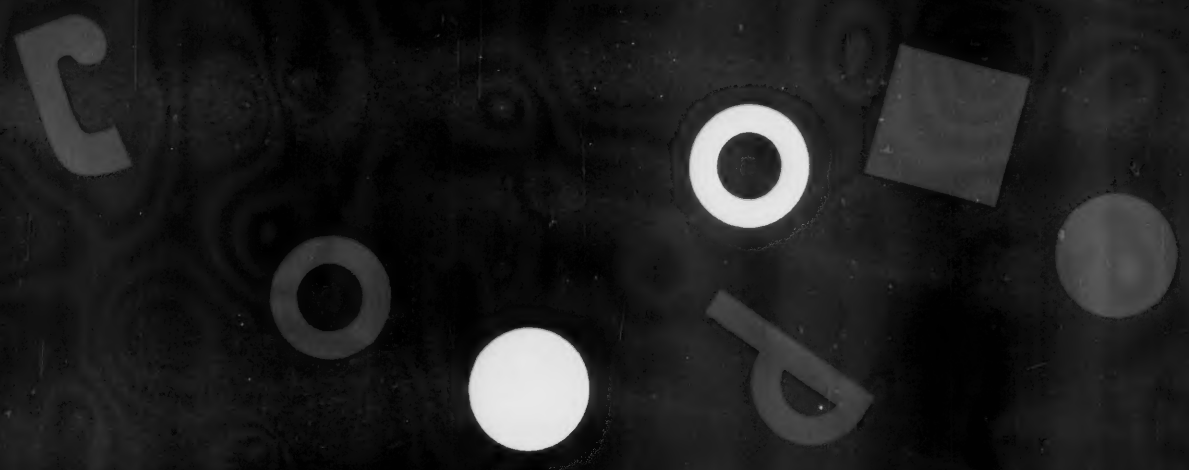

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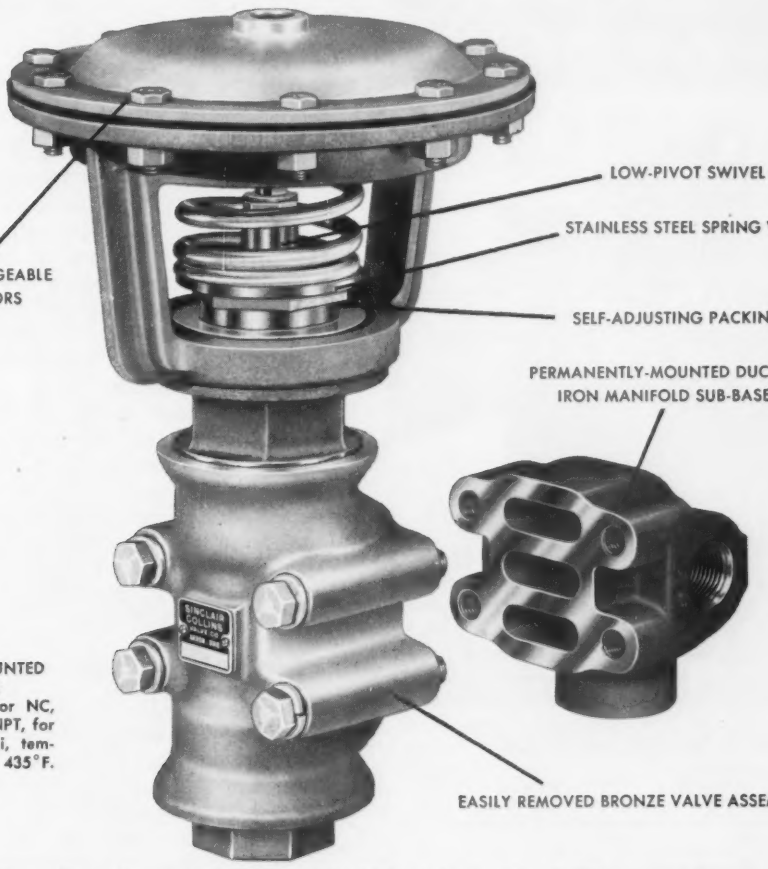

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PATENT REVIEW

by Melvin Nord

Roll for Cleaning Material

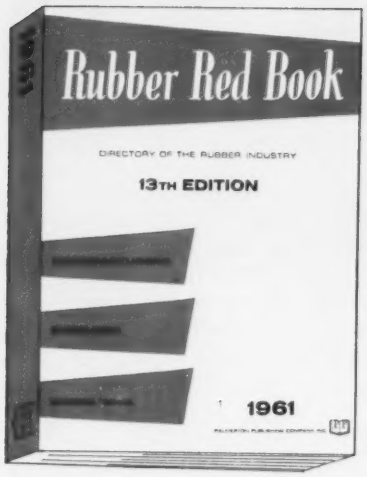
U. S. Patent 2,929,088, issued March 22, 1960, to Robert Wier, Jr., and assigned to Firestone Tire & Rubber Co., relates to cleaning and scrubbing rolls used in the preparation of steel strip for tin plating. The present invention provides a scrubbing brush consisting of a roll with a number of segments, having rubber fingers which strike the strip forcibly with their leading edges, then scrub across the strip, and finally leave the strip with a snapping action. Initial impact of the fingers loosens tightly adhering scale, dirt, and grease; the fingers then bend and their leading edges scrub across the strip; finally, the fingers leave the strip and return to their initial undeflected position, snapping away the dirt from the surface of the strip. This snapping action also results in the fingers being self-cleaning, an important practical consideration.

Process for Treating Cords

U. S. Patent 2,932,078, issued April 12, 1960, to Matthew W. Wilson and assigned to B. F. Goodrich Co., describes a process for preparing cords formed of high polymeric thermoplastic filaments for use as reinforcements in rubber articles, by subjecting the cords to heat setting under tension and cooled. The process consists of: tensioning the cords to an amount in the range of 0.25 to 0.75 pound per cord; heating the tensioned cords to a temperature above 250° F. and less than that to which the cords were subjected during heat setting for a time interval of less than 30 seconds; cooling the cords while still under tension; immediately thereafter increasing the tension on the cords to an amount suitable for passage through a calender; and calendering an elastomeric material on the cords while under tension.

Manufacture of Tires with Wear-Resistant Tread

U. S. Patent 2,933,441, issued April 19, 1960 to Richard G. Mallon, assigned to Astra, Inc., describes a method of producing rubber tires having treads which are of increased wear-resistance. Two compositions of rubber, natural or synthetic or combinations thereof, are prepared. One of these compositions contains sulfur and accelerator, the amounts of which are in accordance with present practice in making a complete tire. This composition is used for making the body portion



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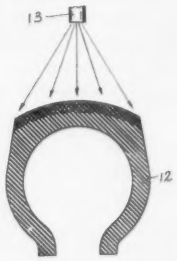
PATENT REVIEW

of the casing. The other composition is one containing a relatively small amount or proportion of sulfur, and no accelerator. The tire is formed into a body of uncured rubber in which the tread portion is laid over and carried by the body portion. The body portion may be of usual form and structure, containing tire cord and/or other reinforcement. The compositions will, or may, as usual contain ingredients in addition to rubber and curing agent.

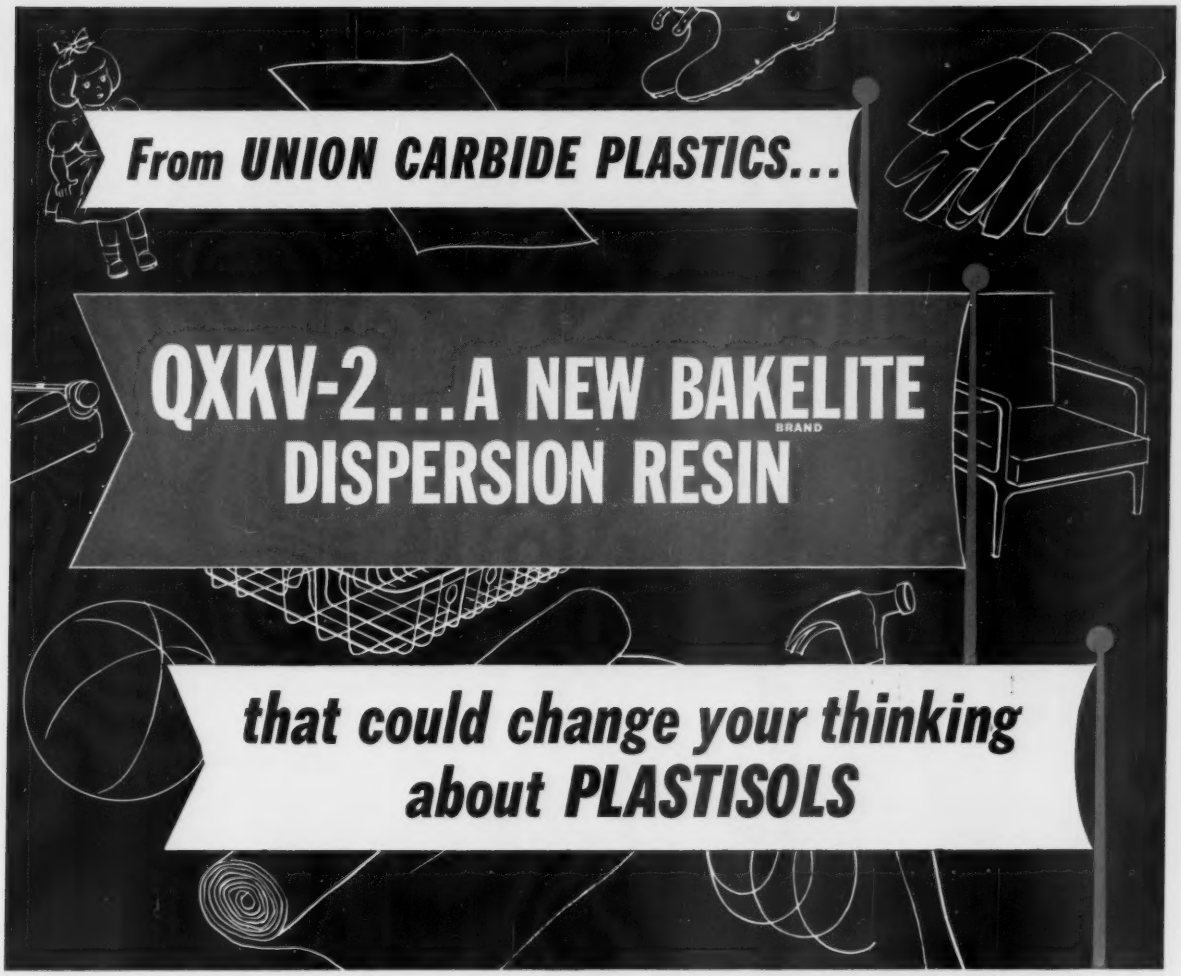
Molding Process

The next step is to place this article in a mold, which may be of a kind customarily used, and in molding the tire the customary air bag may be used. After assembly in the mold of the incomplete tire and the air bag, the mold is subjected to heat for curing. The heat treatment in the mold is continued to the point where the cure of the body portion (as distinguished from the tread portion) is complete, the body portion having set. At this point the tire is removed from the mold and given additional treatment for curing the tread portion. This treatment of the tread portion is effected by ionizing radiation, using, for example, an electron gun (13). The electron gun may be first employed in the manner shown so as to be directed against the tire (12) in the plane of the tire and to send its rays into the tread portion. The depth of pene-



tration of the tread portion by this treatment may be, for example, one half inch. After this treatment there may be, if desired, further use of the gun for the purpose of uniform curing of the tread portion in all parts.

The radiation of the tread portion is intense and preferably localized so that the tread portion only is treated. A beam of high-energy electrons is preferred for this treatment. Other rays, such as X-rays or gamma rays, may be used for this purpose. The result is to give the tread portion the superior properties of radiation-cured rubber. The radiation of the tread portion is continued until the latter is fully cured, and the tire is then ready for sale and use.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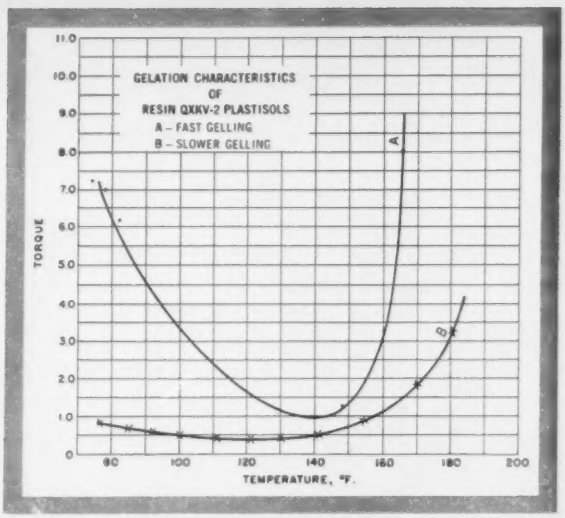

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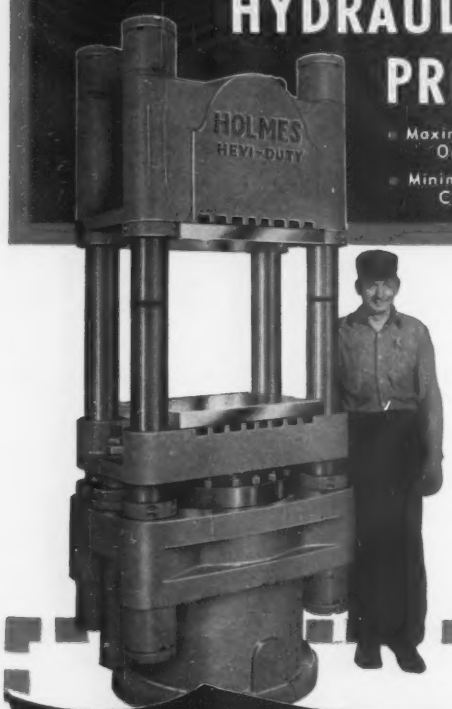

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PATENT REVIEW

Chloroprene Copolymers

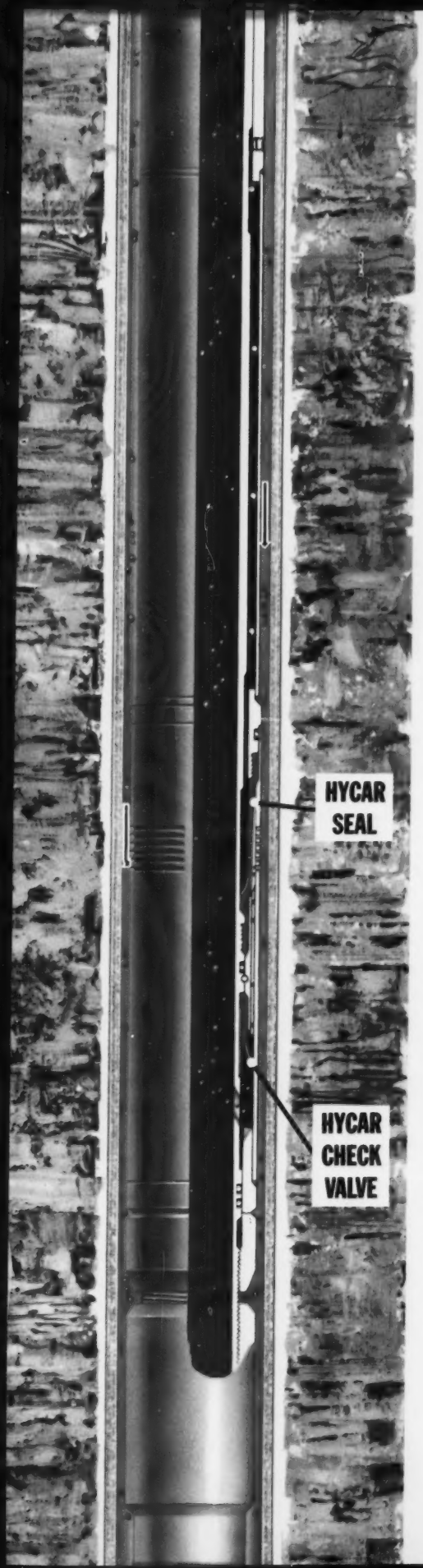
U. S. Patent 2,938,888, issued May 31, 1960, to Elizabeth S. Lo and assigned to Minnesota Mining & Manufacturing Co., provides an elastomeric copolymer capable of being extruded and pressed into sheets at temperatures between 250° and 400°F. at pressures between 500 and 15,000 psi for five to six minutes. The polymer consists of monomer units corresponding to 25-75 mole percent chloroprene and the rest 1,1,3-trifluorobutadiene.

Reclaiming Cured Scrap Polyurethane

U. S. Patent 2,937,151, issued May 17, 1960, to Theodore R. Ten Broeck and Donald W. Peabody, assigned to Goodyear Tire & Rubber Co., discloses a method for reclaiming cured scrap cellular polyurethane. The polyurethane is dissolved in a liquid active-hydrogen-containing polymeric material by heating. The solvent may, for example, consist of a polyalkylene ether glycol.

Other Patents of Interest

Subject	Inventor or Assignee	Patent No.	Date
Electric vulcanizing outfits for tubes	Roland Dupont	2,934,786	5/3/60
Belt and gear drive	United States Rubber Co.	2,934,967	5/3/60
Heat-sealable linings for tires	Phillips Petroleum Co.	2,935,109	5/3/60
Tire building drum	Fred B. Pfeiffer et al	2,935,117	5/3/60
Purification of isoprene	Goodrich-Gulf Chemicals, Inc.	2,935,540	5/3/60
Making tubular rubber latex articles by deposition on an interior mold surface	Pirelli S.p.A.	2,935,765	5/10/60
Apparatus for expanding tubular bodies	United States Rubber Co.	2,936,020	5/10/60
Apparatus for making tire casings	Pirelli S.p.A.	2,936,023	5/10/60
Tire retreading or recapping device	Clement O. Dennis	2,936,484	5/17/60
Power transmission belt	Gates Rubber Co.	2,936,640	5/17/60
Combined cut-off and slitting machine for uncured rubber stock material	Akron Steel Fabricators Co.	2,936,664	5/17/60
Tire band applying mechanism	Goodyear Tire & Rubber Co.	2,936,813	5/17/60
Tubeless tire	Dayton Rubber Co.	2,937,684	5/24/60



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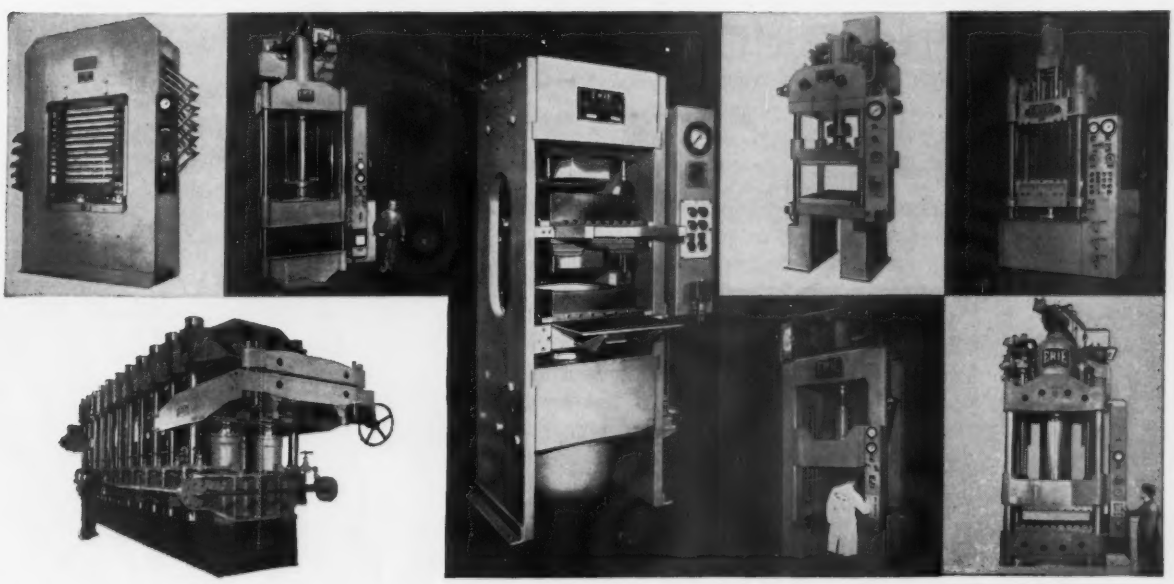

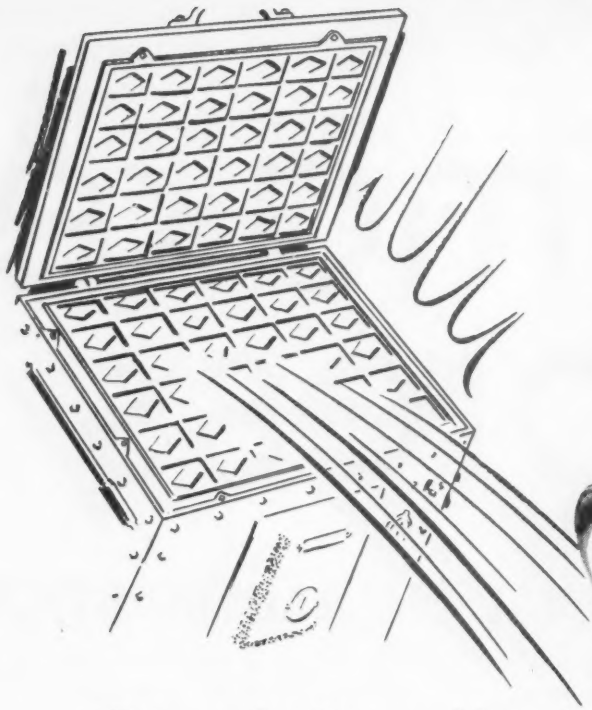

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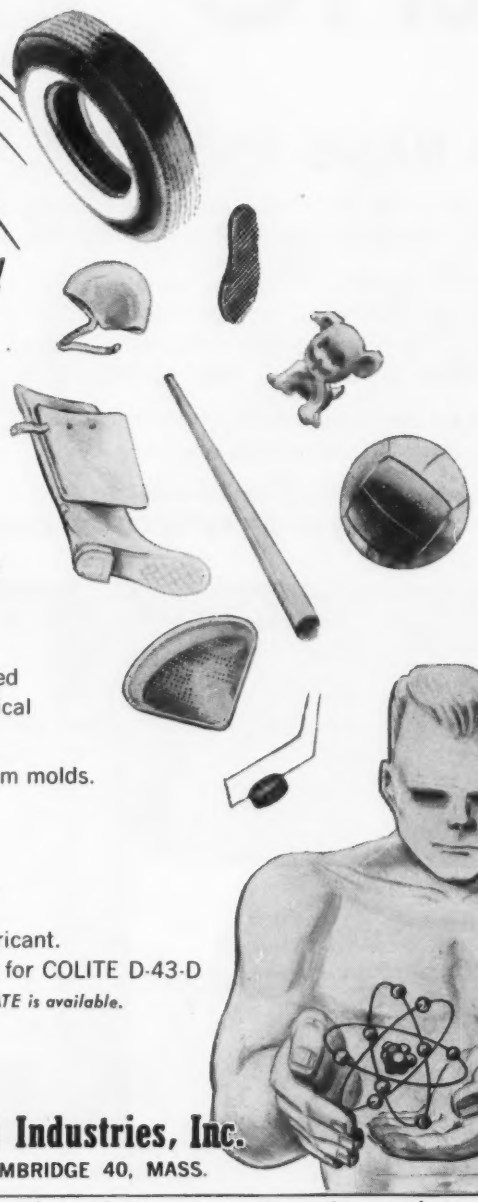

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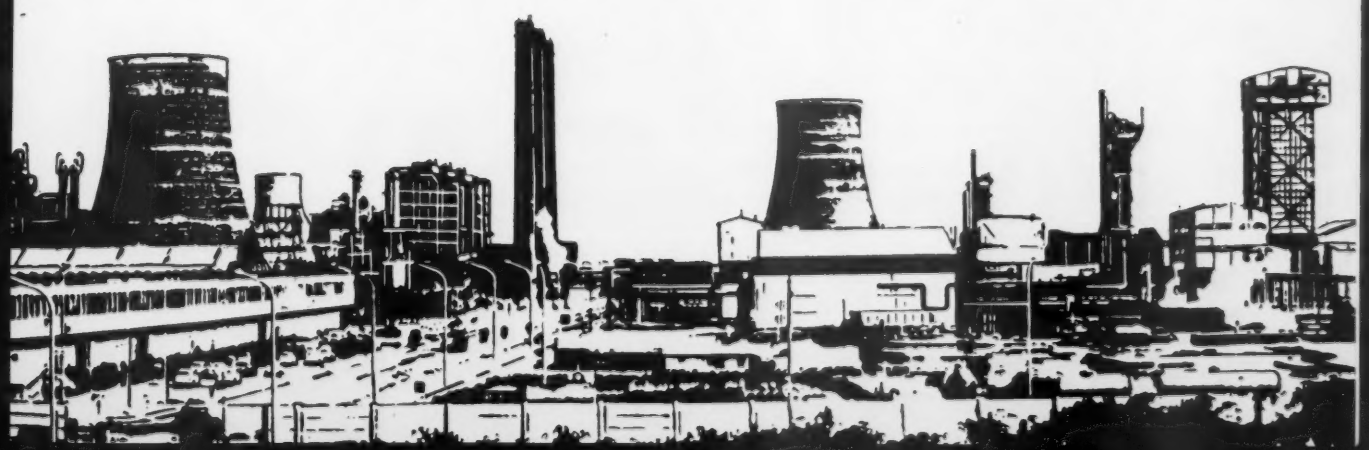

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Application of

Weight Controllers

to the automatic handling of bulk materials

By WALTER M. YOUNG
Richardson Scale Co., Clifton, New Jersey

INDUSTRIAL weighing involves much more today than a scale which, important though it may be as a component in a system, is only one of many components. In this paper I will discuss "Weight Controllers" many of which, I am sure, are familiar but not necessarily recognized by you as controllers of weight. Bulk materials vary infinitely in chemical and physical properties and there has not yet been developed a pat formula that simply classifies the properties and establishes the parameters for proper weight control.

There is a common denominator in the handling of bulk materials by weight which is applicable to many industries. For example, a development in the handling of pigments can be just the answer to a problem in fiber glass; an operation in the feed mill can well find a possible application in the handling of concrete aggregates.

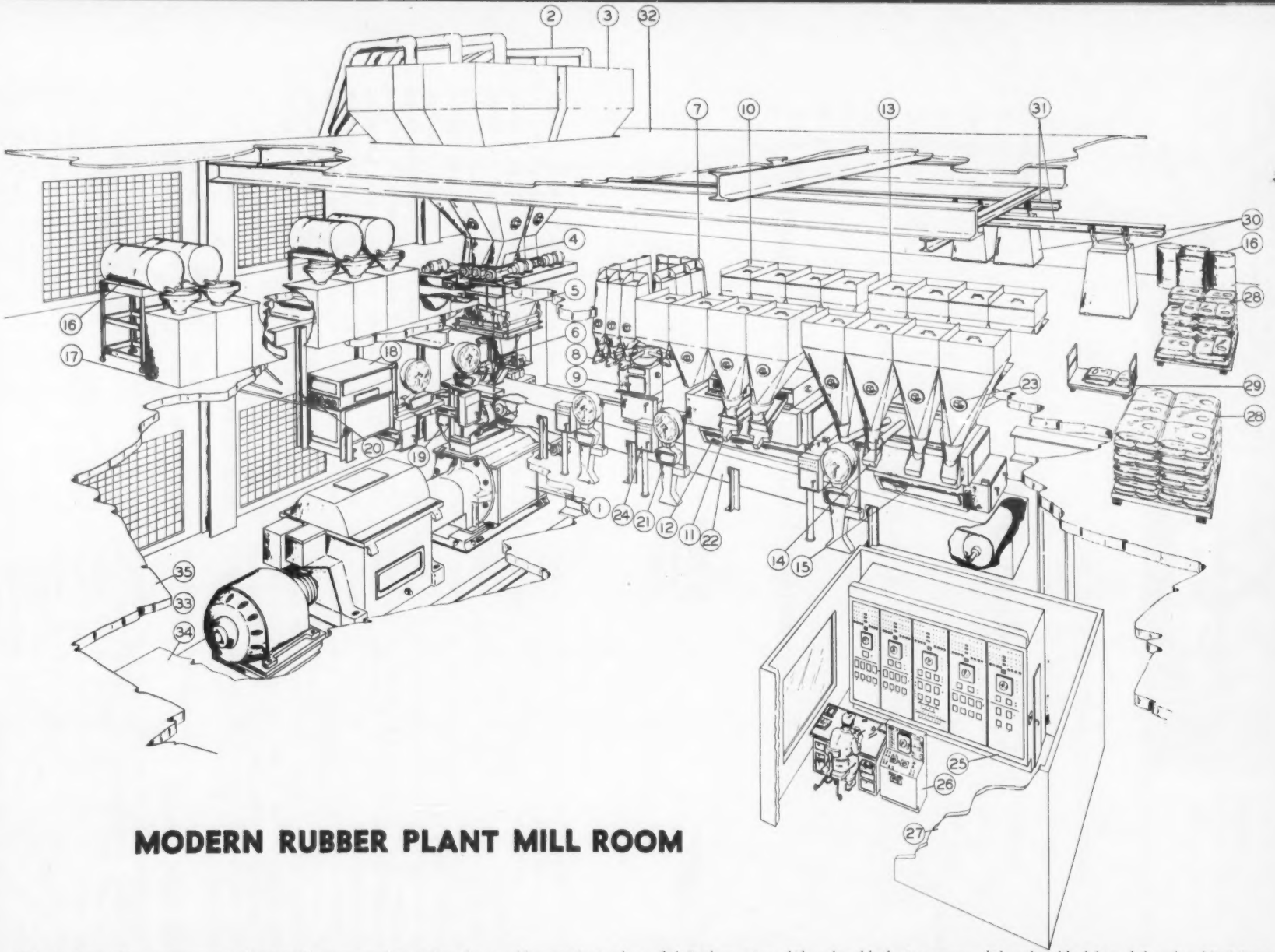
Weight Control Parameters

The parameters for weight control of a process, e.g., rubber compounding to a Banbury, are established only after thorough analysis of the process, time cycles, accuracy requirements, physical limitations, etc. Broadly the "weight control" of a process falls into these three categories: (1) materials handling, (2) weight sensing, and (3) process instrumentation for weight control.

Many rubber compounding systems today are still manual. With labor in attendance it is less important to have good bin and feeder design. If the material arches in the bin, the operator can stop his screw, vibrate the bin, inject air to break the arch, or use one of many other remedies. But eliminate human judgment, and we're in trouble. Automatic vibration, misapplied, may pack the material instead of aiding flow; too much air may cause a flush and flow so erratically that accurate weight control would be impossible. The solution, simply stated, is to eliminate the problem so that human judgment and manual dexterity are not required. Along with this may also be more expense which will have to be weighed against the advantages.

Rubber Mill Room

Let me illustrate the point by looking at a proportioning system which is particularly interesting. A compounding operation in a rubber mill room involves 43 materials required by a manufacturer of mechanical rubber products. In Figure 1 there are six carbon blacks, nine oils, twelve accelerators, eight pigments, and eight grades of rubber pellets available for feeding to the Banbury in combination and quantities prescribed and selected by an operator in the control room. The blacks and oils are fed directly to the Banbury while the others come via collecting



MODERN RUBBER PLANT MILL ROOM

FIG. 1—Prospective arrangement of automatic compounding system for a rubber products plant. (1) Banbury mixer, (2) carbon black air conveyor, (3) carbon black bins, (4) carbon black feeder, (5) carbon black hopper scale, (6) carbon black discharge feeder, (7) accelerator bins, (8) accelerator vibrating feeders, (9) accelerator scale, (10) rubber pellet bins, (11) rubber pellet vibrating feeders, (12) rubber pellet scale, (13) pigment bins, (14) pigment vibrating feeders, (15) pigment scale, (16) oil drums, (17) oil storage tanks, (18) oil scale, (19) oil surge tank, (20) oil feed lines and solenoid valves, (21) select-o-weigh dial scales, (22) collector conveyor, (23) material level controls, (24) feeder control stations, (25) control panel, (26) main console control panel, (27) control room, (28) accelerator-pigment bag storage, (29) pallet truck, (30) rubber pellet tote hopper, (31) overhead tote hopper rail, (32) roof, (33) Banbury base floor, (34) scale and mezzanine floor, (35) storage floor.

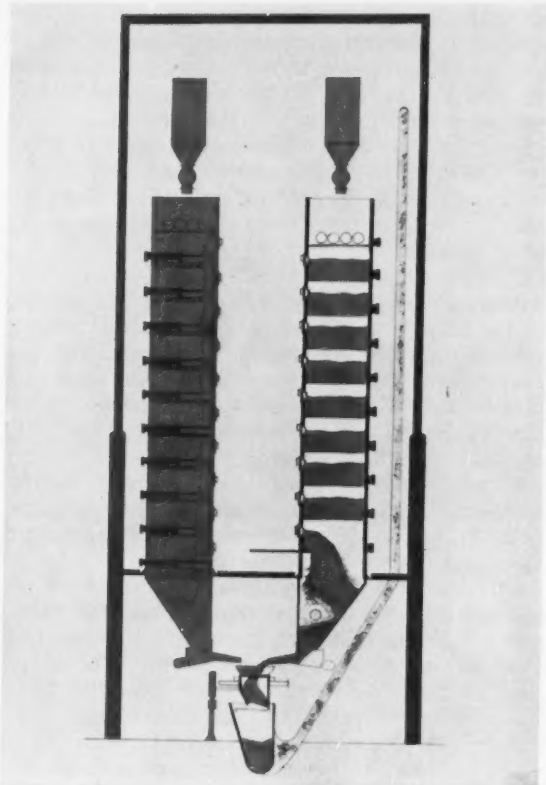


FIG. 2—Stack bins for storing rubber pellets in a graphic control panel for the control of the system.

conveyor. Five scales, one for each group of material, are controlled from the master control panel with servo-driven remote scale indicators so that the operator may monitor all events in the compounding room.

The system has since been doubled—two parallel lines—but one operator, a woman, handles both systems controlling the flow of up to 86 ingredients, producing a batch every 2½ minutes and frequently changing formulae every other batch. Circular charts trace weight performance. This installation is now nearly ten years old but it is still new to many in processing fields.

Automatic Quality Control

These two systems were not justified alone on labor savings. Actually very little was saved because a few men and a well-designed manual system can operate quite efficiently. However, they lack *quality control* with high speed which is a fundamental requirement in successful manufacturing today. This applies particularly to the rubber industry. After ten years a logical question is, "What more can be done as a result of progress since that time?"

Bin Flow Development Aids Weight Control. What goes on in a typical bin? When the slide of a bin full of granular material is opened, the material flow starts. If this bin is filled while it is emptying it acts as a spout with material flowing through the center and the rest of the material remains dormant. This stratification exists until the very end, leaving the material on the sides until last. The same situation exists with one straight side, emptying out rapidly along the straight side and hanging back on the curved side.

If we change to a powdered material with the same type of bin, very little happens when the slide is opened. Then suddenly the entire column begins to shear off and drop out. More material is ready to topple over and drop like a piston in a cylinder, driving the displaced air ahead of it in an uncontrollable rush. What good is a perfect scale if it is fed like this?

Trial and Error

There is no pat formula for such problems because materials differ from hot liquids to flushy powders. Materials may be corrosive, abrasive, hygroscopic, inflammable, toxic, even radioactive, and these factors have far more influence on automatic scale design than the sensitivity of the scale component. Bins, spouts, weigh hoppers, and the like must be designed to suit the material handled. Frequently much development is required and from our experience, the only method is the one successfully used by Thomas Edison—trial and error—sweat and tears.

An example is a method devised to store rubber pellets in large quantities for weight control. It used to be that storage was possible only in portable gon-

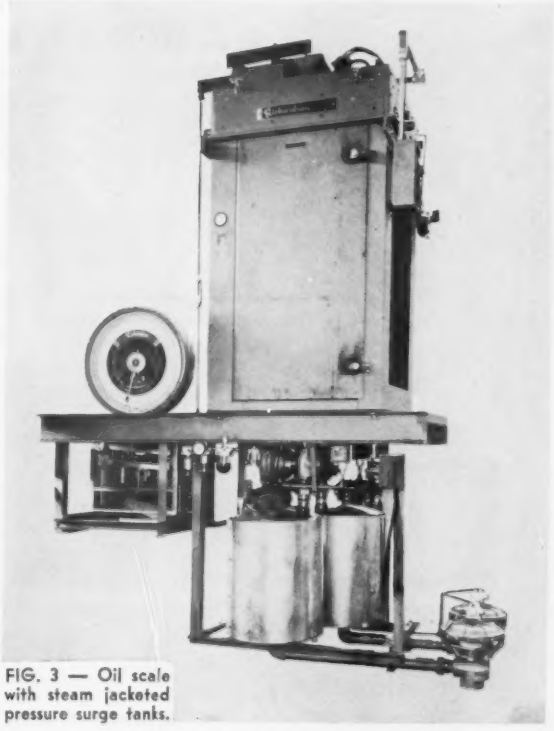


FIG. 3 — Oil scale with steam jacketed pressure surge tanks.

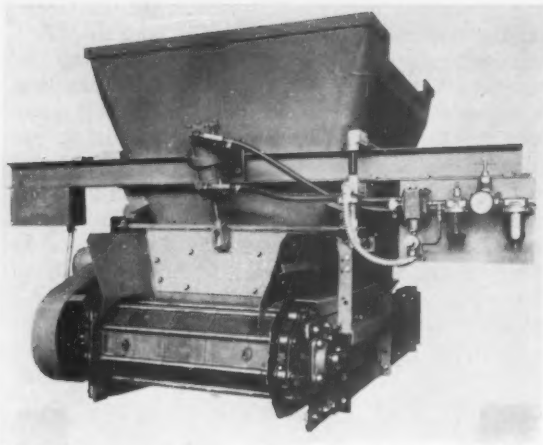


FIG. 4—Conveyor type rubber pellet scale.

dolas containing about one ton each. More than three feet head caused the pellets to stick together under pressure. The problem was solved by the development of stack bins (Figure 2) in which one ton quantities are stored in compartments, each above the other, with an air-operated supporting plate in each to prevent an accumulating pressure. The operation of these sliding plates is fully automatic. As material is drawn off into process from the bottom, the one ton quantities keep progressing downward and the supply is replenished automatically at the top. This is an excellent example of how a basic material may be altered physically before it was suitable for handling in automatic proportioning systems.

Similarly, laboratory experiments have since produced better feeders and bin designs for carbon black, accelerators, pigments, pellets, and oils. Although material test laboratories are still scarce in the scale industry, the subject has been given top priority by a few scale manufacturers. Professional societies are devoting time and money to find a place in science for the subject of solids flow. The Scale Manufacturers Association, Washington, D.C., represents the great majority of reputable mechanical and electronic scale builders who, as a group, are rendering technical service to industry, second to none, wherever industrial weighing is involved.

Materials-handling Scales That Improve Weight Control. There have been some noteworthy developments in materials handling scales for better weight control. A few will be described.

Oil Scales. Oil blending has long been a substantial problem in mill room compounding, and the scales shown in Figure 3 illustrate a successful solution. The scales provide for feeding valve inlets for up to twenty oils. Two separate weigh tanks are suspended on a common beam system so that staining and non-staining can be handled separately. The housing is steam jacketed and pressurized in order to maintain

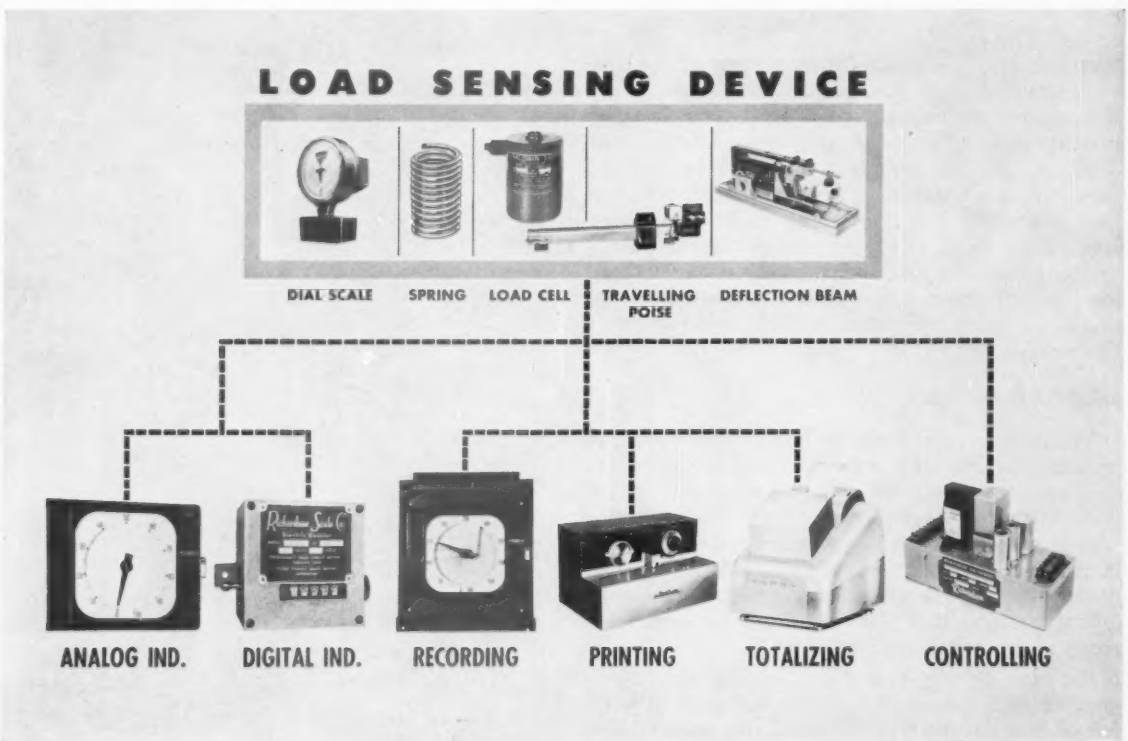


FIG. 5—Illustration of different types of weight sensors.

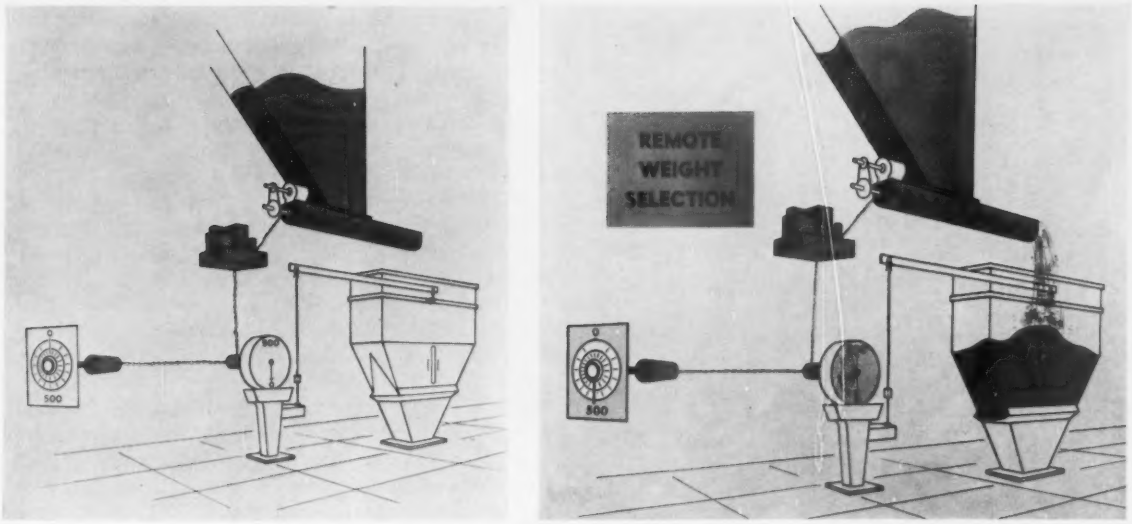


FIG. 6—A diagramatic arrangement of remote weight selection by potentiometric control. Before loading (left); during loading (right). Note dial positions.

a proper temperature for good flow. Figure 3 includes pressure surge tanks to which the oil is discharged from the weigh tank in preparation for pressurized flow to the Banbury. Two tanks are used for staining and nonstaining. Instead of blow tanks, a pumping system can be substituted for pressure surge tanks. Capacities range up to 150 pounds.

Rubber Pellet Scale. Two types are available. The bucket type of pellet scale is used when the pellets are blended away from the Banbury and require a conveying means to the Banbury (usually an air conveyor). When the scale is remote from the Banbury, it usually serves more than one. The conveyor type pellet scale shown in Figure 4 is usually mounted directly at Banbury site with the feeder serving as the discharge door and also the feeding means to the Banbury. Capacities are available in 500 and 1,000 pound batches.

Carbon Black Scale. Carbon black scales are sized for Model 3, 11, and 27 Banburies. In all cases the weigh hopper slopes are extremely generous, frequently fabricated in stainless steel. The discharge device can be an air-operated gate valve or a specially developed rotary feeder. The feeder is used when it is desirable to control the rate of carbon flow into the Banbury, and also for feeding black to the Banbury over and under the ram. The scales are sensitive to one part in 1,000 and can be controlled with that degree of accuracy.

Accelerator Scale. A five pound accelerator scale for blending four types is unique. Unlike its larger brothers, it uses a load cell for weight sensing. It has a sensitivity of 0.01 pounds and was developed to automatically blend the tiny ingredients used in mill compounding.

Weight Sensing Devices. The weight sensing device is the "brain" of any automatic weighing system regardless of complexity. The common beam scale is the original load sensor and, I believe, still the most accurate if you are weighing by hand. There are others (Figure 5) which produce an output signal useable for weight control:

(1) Dial scale when equipped with transducer.
(2) The coil spring when equipped with transducer.
(3) The load cell (electrical, pneumatic, and hydraulic).
(4) The power driven poise.
(5) The cantilever beam with transducer.

Weight sensing devices permit the application of all kinds of instrumentation. There is much which the scale and instrument company can furnish today to meet the most complex requirement of the process engineer.

Instrumentation for Better Weight Control. Some of these basic instrumentation devices that work from the weight sensors are:

(1) The analog indicator which is driven by a servo-motor and indicates remotely the exact path of the pointer on a dial type scale, or for the load cell indicates the level of voltage output which, in turn, is equal to weight.

(2) The circular chart recorder—similar to the indicator with a trace recording mechanism.

(3) The typewriter records weight information in ledger form. This is a digital device; that is to say, it must be fed pulses rather than a voltage level (analog). As such, an analog to digital control converter must be used which converts motion into numbers and transfers these numbers in the form of pulse to the typewriter.

(4) The printing totalizer which is a combination of the adding machine and the printer. Individual weights are printed as they are made and a total

FIG. 7—Three types of weight selectors.

thereby becomes available at will, by use of the printing totalizer.

(5) The over/under meter monitors the correctness of each weighing. Tolerances are set on the meter and if any weighing exceeds the preset tolerance, an alarm sounds.

Remote Weight Control. Reduced to its simplest form, remote control of a scale consists of a remotely controlled precision potentiometer and an output transducer mounted on a dial spindle (Figure 6). The precision potentiometer is positioned for the desired weight, say 500 pounds, thereby setting up a reference voltage on the bridge. This voltage is then matched by the voltage output from the control potentiometer mounted on the dial scale spindle. At the point of voltage balance between the weight selector potentiometer and the dial potentiometer a signal is transmitted to an electronic relay resulting in the energizing of a current-sensitive relay. The electronic relay is now transistorized.

Impress Intelligence

There are a variety of methods used to impress intelligence into a weighing system, the most common being the manual weight selector (Figure 7). It consists of a vernier marked to match the capacity of the scale. As previously explained, the vernier rotates a precision multiple-turn potentiometer for use as the reference voltage for weight control. The small adjustment below the vernier is called the compensator and its function is to make an electronic adjustment to the weight selection, compensating the control point to make up for the falling column at material cut-off.

A more recent development (a trend to miniaturization) is the Formula Capsule. Electrically it is identical in all respects to the weight selectors except the potentiometers are tiny in comparison, allowing 24 to be installed in a capsule that fits in the palm of a hand. It is particularly useful where size is important and where frequent formula change is a requirement. The capsule is preset in a separate instrument (this is usually done under responsible supervision) and is appropriately marked with material identification plus weight required and formula number.

It is common to have a library of ten or more so that an operator can simply remove one and insert another. When formula changes are frequent and many, this method requires a substantial investment in capsules. In this case, the punched card method is recommended. Standard I.B.M. cards (Figure 8) are used with format designed to suit the process. The card data can control selection and weight of material, time functions, temperature function, and many other miscellaneous functions dictated by the process. Generally, it is the control of "When", "What", and "How Much." Electrically, the Punched Card Reader senses the holes in the card—80 vertical columns and 12 horizontal rows—for a total of 960 single bits of information. A visual digital indicator is part of the card control system. The card, once inserted into the press, is no longer visible to an operator. So, the information on the card is channeled to indicators keeping the operator well informed. A list of advantages and disadvantages may help clarify the card application:

Advantages

(1) Ample data storage capacity in the card.

(2) Since cards are used for so many other functions throughout plant operation today, personnel who understand card systems are available.

(3) Cards are inexpensive.

(4) Cards are a permanent record.

(5) Cards permit quick formula change.

(6) When secret formulation is required, cards maintain the required secrecy.

Disadvantages

(1) Careless handling damages the card.

(2) Excessive dirt is detrimental to operation.

(3) Card punching equipment is required.

(4) Once formula is punched, the card cannot be altered; a new card is required.

FIG. 8—Typical I.B.M. card used with the Punched Card Reader.

FIG. 9—Liquid latex blending system using electric load cells as weight sensors.

(5) Card selection may be a problem if a large number of cards are kept on hand.

Where it is *not* possible to operate in a clear area, the more durable Formula Board serves as a worthy substitute for the punched card. The programming data is set up with pegs instead of holes. A verifier has been developed as a checking device to make certain the data patched into the board is correct.

Installations. For a quick review of the variety of weight controllers explained in this article, let us look at a few proportioning systems.

Latex Blending. An all liquid blending system uses pumps for feeders and tanks for weigh hoppers (Figure 9). The weight sensors are load cells of the electrical type. There are three 20,000 pound tanks and one 2,000 pound tank. Each tank is supported by three Baldwin-Lima-Hamilton SR-4 strain gauge cells. Load cell outputs are fed to one recorder in a pre-established sequence.

Modern Feed Mill. Weight control here requires specially developed bin feeders and scale design for a 6,000 pound main mix blending scale and a 50 pound micro-mix scale (Figure 10). Dial scales are used as the weight sensors and punched cards are used to select the material and the quantity.

The purpose of showing so many illustrations is not to explain the myriad of detail that goes into planning and execution of these installations, but rather to show the extent of special application necessary to solve successfully various process requirements. Much has been done in the rubber industry; still much more remains to be accomplished. Scale manufacturers who serve all industries may be able to contribute substantially to many manufacturers in the rubber industry.

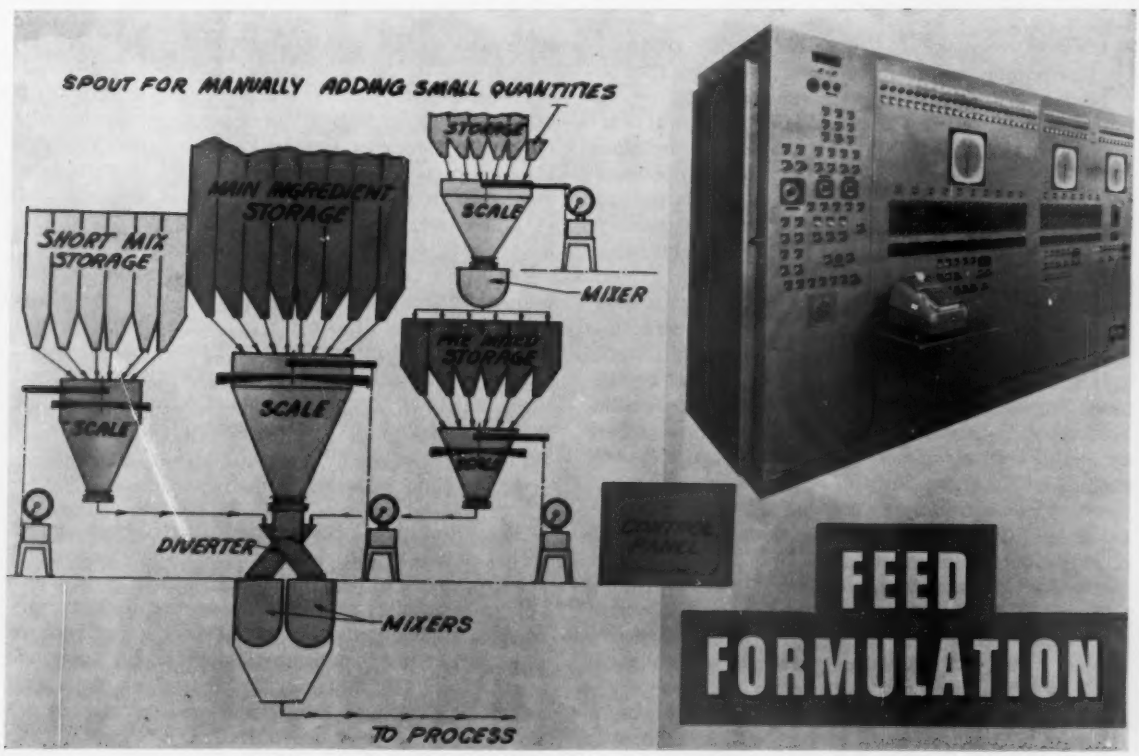


FIG. 10—Punch card controlled blending system for a modern feed mill.

Quality Control

in the Rubber Industry

PART

0 1 2 3 4 5

INTRODUCTION

By Simon COLLIER and Edward A. REYNOLDS

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DURING recent years, the term "quality control" has become increasingly common in the rubber industry—just as it has some years before in many other types of manufacture. Today we hear of "quality controlled" truck tires, packings, bathtub mats and baby feeders. To all who use it the term implies some improvement in quality of product, achieved by scientific method. However the exact definition is probably as varied as the men and companies who use it.

To some (fortunately their number decreases each year) it is only a fancy sales slogan for the same inspection and testing done for many years. To others, it is the installation of some piece of control equipment intended to better regulate some portion of the production process. Still others use it to mean sampling (either rule-of-thumb or statistically designed) in place of prior 100 per cent sorting inspections, or more broadly, to indicate a group of statistical techniques for the more useful evaluation of either routine or investigational data. To a few, it is some planned program for improvement of prides and skills at several levels of workmanship. Or "quality control" may be competitive comparisons; field testing of new designs; or product tests by ultrasonics, radiography, or automatic gauge.

To an increasing number of control executives, it is all of these, and more. Modern quality control is a combination of many administrative, engineering, mathematical and personnel methods—all aimed at helping to produce a uniformly satisfactory product at lowest over-all cost. *It is a planned system,* not for perfection, but for *satisfaction of purpose economically* (in either money or time). Its aim is not to make a better product regardless of expense, nor to save money regardless of quality. Rather, it balances cost vs. quality and also works to constantly improve quality at lower cost.

Quality control is a dynamic science, with ever improving methods through developments in instrumentation, in data processing, in testing methods, statistics, industrial organization and personnel practices. Those executives who wish a quick check on their ideas and their company practices may find the quiz in Exhibit Number One of interest.

Status of QC in Rubber

Many traditional fields of industry (rubber among them) have lagged behind mass-production metal working and assembly industries, and in general are behind such areas as electronic, nuclear and pharmaceutical manufacture, in understanding and use of these newer philosophies and methods for economic control of quality. It is the writers' opinions that this is not because these ideas and techniques are less applicable to rubber. Rather it seems due to (1) generally less scientific training of many rubber

managers and executives than in some of the above mentioned industries, (2) less basic change in product and process than in some industries, (3) less interest of rubber technical executives in other types of manufacture and other areas of science, and thus less opportunity to learn from other groups, and (4) the traditional rubber company organization, with division of responsibilities between "technical" and "production," has made it difficult to apply technical-production methods of control which by their very nature must cut across the frontier between these two groups.

Of course, the installation of improved systems of quality control has also been somewhat delayed by the over-selling of some of its techniques. Some companies have had the unfortunate experience of trying to install these methods at too low a level, or by men inadequate in either technical training or in process experience, or both. However, all industries have had these growing pains to at least the degree experienced in the rubber industry.

Regardless of cause, it does seem that the majority of rubber companies have been slow to take advantage of the principles expressed by Shewhart *(1)* nearly 30 years ago, or by Juran *(2 and 3)* 15 years ago. However, during the last several years, many of the major and middle-sized rubber companies, and a few of the smaller ones, have revised or reorganized their quality-controlling functions in an effort to prevent complaint epidemics and to reduce costs due to scrap, repairs, downgrading, sorting inspections, etc. Today, we find men in these companies studying quality organization, statistics, inspector training, technical data processing and non-destructive testing—many for the first time in their company's history. This is most encouraging.

It is believed by the writers that major savings and product improvements are possible in many sections of the rubber industry through carefully planned programs of quality control: programs which will utilize fully both the experience within the company and the new techniques developed and tested elsewhere. It is also expected that, just as rubber manufacturers can learn from other types of companies, so they can contribute importantly to the broad technology of quality control. Increased interchange between rubber experts and those from other fields will surely benefit both.

It is hoped that this series of articles will be of some help in explaining major aspects of modern quality control and in pointing out both advantages and possible pitfalls in application. Although some specific advice will be given, in an attempt to aid the moderate sized rubber company start an improved quality program, the writers will consider this series worthy if it encourages management to give thought, discussion and advanced study to the newer control methods.

A New Series

► This is Part I of an extensive article on quality control, intended to help the technical executive better understand and use new developments in quality control concepts, organization and techniques. The editors of RUBBER AGE believe that readers will be able to use many of the ideas as a useful manual and as a spur to original thinking about specific problems.

Part I is introductory in nature, setting the theme for that which follows. Part II will discuss quality control (often referred to as QC) functions, quality responsibilities of other sections of the company, advantages and disadvantages of typical QC organizations, selection, training, direction and evaluation of QC personnel.

Statistical methods in quality control is the theme of Part III. It covers simple evaluation of data in the form of graphs, frequency distributions and other basic statistical measures, control charts and sampling, experimental statistics, trouble-shooting, evaluation and effective utilization of statistical methods.

Part IV discusses records, reports and data handling: simplification of records, determining record needs and effectiveness, filing methods in QC, data processing techniques for the small plant, and outside services in data processing.

Part V concludes the article, covering engineering aspects: specifications and standards, inspection techniques, automatic controls, applications of non-destructive tests to rubber, laboratory improvements and evaluations, performance testing, life tests, and other engineering considerations.

History of QC

Industrial progress in controlling quality has proceeded through four rather well defined steps. Although almost all companies combine these, at least to some degree, the control executive will have little difficulty in determining which represents the predominate type of quality control in his own organization.

(1) Control by artisans: Originally all quality was controlled solely by the individual workman, making items to his own standard and design, and with success dependent almost solely upon his own interest and skill. Actually, this is still the basic method of obtaining quality—if we define today's "artisans" as executives, designers and technicians of a modern plant. However in many companies their efforts have been aided — never replaced — by the steps listed below.

(2) Control by product sorting: In an effort to standardize quality and compensate for careless or inadequate operations, attempts have been made, and continue, to "inspect quality into the product." This is usually done by some separate group, with little or no responsibility for the production of defects. Modern quality control finds nothing basically wrong with such sorting, provided it is economically justified. Many

EXHIBIT I

Quality Control Quiz

If you can honestly answer "Yes" to these ten questions, you and your company are probably up-to-date on use of modern quality control. Several "Nos" indicates you may well benefit from a careful investigation of the methods for improved quality at lower cost.

(1) Do you know the annual total cost of your quality losses and expenses (scrap, shrinkages, rework, repairs, salvage operations, downgrading, complaints and adjustments, inspection, testing, "trouble-shooting", delays due to bad quality, etc.)? ——

(2) Have you adequately defined the responsibilities for various quality controlling functions (preparation and approval of standards, design approvals, materials and process controls, disposition of border-line items, quality investigations, records and reports, etc.) and do your men understand their own functions and authorities and also those of other sections? ——

(3) Is there good communications on quality problems, so that scrap or complaint trends are promptly and accurately called to attention, all involved know the status of special studies, records are factual and convenient, etc.? ——

(4) Are facts (impartial, accurate and adequate) available to help management make most of its quality decisions? ——

(5) Do you have written and enforced specifications and standards as necessary to control uniformity of materials, process and products? ——

(6) Have you determined what portion of your quality losses or problems are due to personnel errors (hourly or salary) and, if this is large, planned programs to increase both employees' interests and skills? ——

(7) Are you, or your subordinates, familiar with recent technical advances in instrumentation, statistics, automatic inspection, laboratory tests and product non-destructive testing; and, as evidence of this, are you a member of the technical societies (ASTM, ASQC, ISA, and SNT)? ——

(8) Do you also realize that quality controlling continues to become more complex technically, and are you or your technical subordinates taking formal courses or working for advanced degrees in these fields? ——

(9) Do you have technical reliability assurance that the product you are producing today will both pass final tests and also prove satisfactory in the field? ——

(10) Are you planning and expecting (not just hoping!) to produce an even better product next year at even lower cost? ——

SCORE: ——— Per Cent

EXHIBIT II

Sample Estimate of Annual Cost of Quality and Quality Losses

(1) Quality Losses		
(a) In-process scrap & material shrinkage		
Allowed by standard costs	$40,000	
Unfavorable variances	30,000	
Total		$70,000
(b) Downgrading Of Product To Seconds and Restricted Use		80,000
(c) Rework & Repair Operations		
Extruder start-up loss	20,000	
Extruder rejects	30,000	
Banbury rework	30,000	
Finished product repair & spec. operations	50,000	
Other rework	10,000	
Total		140,000
(d) Adjustment and Complaints		
Customer allowances for defective product	40,000	
Customer policy adjustment	not counted	
Expense in handling complaints	20,000	
Customer ill will	not counted	
Total		60,000
(e) Production and delivery delays due to quality (estimated)		50,000
Total Quality Loss		**$400,000**
(2) Quality Maintenance Costs		
(a) Material testing and vendor control		$30,000
(b) Process control		10,000
(c) Technical "trouble-shooting"		30,000
(d) 100% product inspection and sorting*		110,000
(e) Quality records and reports		5,000
Total Quality Maintenance Costs		**$185,000**
Total Cost of Quality		**$585,000**

* Many companies consider 100 per cent sorting costs to be part of "Quality Loss" rather than "Quality Maintenance."

mechanical, electronic, and personnel methods have been developed to improve both the effectiveness and the economy of such inspections. Product quality *can* be improved by detail sorting, but frequently there are more effective and less expensive methods. Although there are obvious drawbacks in depending primarily on this method of maintaining quality, it has the advantage, theoretically at least, of requiring management to establish definite standards of quality which will be impartially enforced. Unfortunately, such standards have often been either so vague, or so impractical without adequate process control, that they were enforceable only in periods of "good production." The rejects of yesterday might be better than the accepted items of today. Also, especially in the rubber industry, there has often been a very tenuous relationship, at best, between the visual inspection standards and actual customer satisfaction.

(3) Statistical process control: Basically, this is a system of control over materials and processes to prevent defects. Factual data is used to supplement opinions. Both in its planned prevention program and its use of numerical facts, it represents an important step in making the process less of an art and more of a science. A major part of such plans has been the use of statistical methods to determine logical specifications, more quickly detect and evaluate trends or quality shifts, and help locate causes for defects. The statistical methods used may be very simple or very complex, depending upon the complexity of the problem. Contrary to popular opinions, sampling is usually a very minor part of such a program and the methods of process control can often be applied to limited production runs, or "job shop" operations. Since such control programs usually consider evaluation and approval of designs, raw materials, in-process items or operations and final products, the term "total quality control" is sometimes used. Actually no logical system of quality control is really "total" since it only attempts to control those variables which economically require such control.

(4) Automatic process and product control: As operation speeds increase and tolerances and reliability requirements tighten, automatic control has become necessary on many processes. New developments in nucleonics, electronics and sonics, air gauging, etc.—as well as the availability of computer systems—have made such controls increasingly practical. In addition there are new techniques of non destructive testing that offer good possibilities of 100 per cent product testing and increased reliability, as well as lower costs, over previous sampling for destructive or life tests. Such automatic controls do not replace the need for statistical techniques. Although samplings and control charts may be reduced, there remains the need for process studies, test and product evaluations, and careful correlation of product tests with standards and with service.

While the trend in quality control is a progression through the above four phases, each retains much of the preceding steps and it appears likely that logical control programs of the future will effectively combine all four of these.

Modern QC Methods

Quality control uses a combination of management, engineering, and statistical methods. Statistical techniques vary from simple graphs to complex experimental designs. Engineering methods commonly include non-destructive testing, automatic or improved inspection or testing (often with data-feedback for control), improved location, layout, or methods of inspection, etc. Management methods include quality cost reports, good organization of control and corrective functions, encouragement of employee "quality mindedness," training of personnel, etc. Regardless of detail, the basic method employed in quality control is:

(1) Determine the extent and location of quality dollar losses and problems.

(2) Locate the basic causes for these (based on data, not opinions).

(3) Determine the engineering or management corrections required.

(4) See that these corrections are made.

(5) Establish necessary controls to insure economical and uniform operation.

About the Authors

► Simon Collier recently retired as Director of Quality Control after 37 years with the Johns-Manville Corp. A past president of the American Society for Quality Control, he is still active in this field as chairman of the American Society of Testing Materials committees E-11, Quality Control, and D-11, Rubber and Rubberlike Products. He recently became the first recipient of the Edwards Medal, conferred by the American Society for Quality Control for his contributions to advancing the use of statistical quality control in industry. Prior to his years with the Johns-Manville Corp., he was in charge of the rubber work at the National Bureau of Standards. He received a B.S. in chemistry from Worcester Polytechnic Institute.

Edward A. Reynolds has been engaged in quality control engineering, management, training and consulting for the past 25 years and has worked on quality problems with over 200 companies, including several in rubber manufacture.

Cost of Quality Control

Actually, a proper program for improved quality control should cost nothing. The purpose of quality control is to save money, not spend it. Of course, often a program will emphasize the need for expenditures in order to provide much greater savings. In addition, in practically all cases, some additional costs for personnel or facilities will be required to start such a proper program of quality control. The amount will depend upon current organization, extent of problems, and the speed with which results are required. However, in all cases, the company should expect that savings will easily pay for the cost of starting a modern program.

A logical basis for determining the need and justifiable expenditure for a quality control program is to first calculate (or estimate if necessary) the total "Quality Costs and Losses" (see sample in Exhibit Number Two). This includes all scrap, inherent processing losses, repairs, reclaim or "special" operations, inspection and testing costs (even though required by specification), down-grading of product, complaints, and all other losses resulting from imperfect materials, processes, and operators. In companies without a modern quality system, this cost will rarely be known and, when calculated, will often be surprisingly high.

A good system of quality control should reduce this total quality cost by 25 per cent to 50 per cent, sometimes more, seldom less. In general, a sensible first-year budget for improved quality control will not be more than one-quarter of the expected annual saving, or less than one-tenth of the total current "Quality Costs and Losses."

The speed with which a program will produce savings depends upon the nature of the problems, the skill of its quality head, and the degree of cooperation from the other sections of the company. Normally, a quality control program should begin to pay its own way after eight to twelve months and show major savings at the end of eighteen months.

Starting QC Program

The first step in any program is to evaluate the need. A first approximate study of "Quality Costs and Losses" should indicate the possible value of a more economical control program and also show where detailed investigations should be made to determine improvements in quality or reduction in costs. For example, there is no point in devoting major attention to raw material control if this is apparently a minor cause for quality losses. If, on the other hand, dimensional or appearance rejects at some processing point are a major loss, this may be a good place to start in an attempt to determine cause and required correction.

Many companies make the mistake of trying to install some changed system of quality control too quickly over all operations. While general organizational and administrative changes often must be made to permit a modern approach to control problems, it is far better whenever practical to limit the program initially to one or two specific projects. Naturally these should be chosen on a basis of maximum value and need—not because they seem simple of application, or innocuous in failure.

Selecting QC Head

Even before beginning a program of improved quality control in a restricted area, management must select some person to do the job. This can be done in one of three ways (often a combination of two will be best).

(1) Hiring a quality manager or engineer. This has the advantage of securing a previously trained and presumably competent man immediately and without adding to the work load of the present organization. The disadvantages of not promoting from within, of possible lack of experience in specific processes and products, and of inaccurate selection must be carefully considered. A later article will discuss selection of quality control personnel in some detail.

(2) Training a present employee. Although more time consuming this may be far better in the long run, provided the person selected is really competent to absorb the training and interested in this type of work. Such selection should be guided by the same principles as in hiring a new employee. The company should realize modern quality control direction requires scientific and administrative skills normally far beyond the typical inspector or shop foreman. Sometimes selection of a present employee can be usefully combined with hiring an engineer with prior training in quality control. Which will be the leader and which will be the understudy—and assistant—should depend upon the potential ability available within the current organization.

(3) Using a QC consultant. Qualified consultants have a useful place in some quality control programs and may save the company appreciable time or money. In general, there are three groups of consultants who do quality controlling work: (a) general management consultants who do QC work as a part of their broader services, (b) men who limit themselves to QC activities but cover many of its administrative and technical areas, and (c) specialists who confine their technical work largely to one area—such as statistical aspects, non-destructive testing, gauging, etc.

While an experienced outside viewpoint is often helpful, even in companies with well-qualified QC men, and although the consultant can frequently be of assistance on new or complex problems, the use of a consultant will not replace the need for competent men within the company. Eventually, the company must secure or train its own staff to handle the daily problems of quality controlling. The idea that "an expert can organize a department which will be operated later by poorly qualified personnel"

is unduly optimistic and does not take into account the dynamic nature of QC work. Perhaps the greatest services a consultant can offer are: (a) to help management determine the need (if any) for an improved quality program, (b) to assist in the selection and training of QC personnel, and (c) to occasionally appraise progress and plans of the QC group. With the exception of very small companies and beginning periods while training a basically competent employee as QC head, the writers do not recommend the continued use of a consultant as a "part-time QC Manager."

Summary

The following points are suggested to the executive responsible for economic control of quality:

(1) Realize there have been important improvements in both administrative and technical methods of quality control. To date, many have had only limited use in rubber manufacture, but their use is expanding because they are proving valuable.

(2) Know your actual costs and losses due to imperfect manufacture, and decide whether this amount is sufficient to warrant careful investigation of methods for reduction.

(3) Find out if your key men (yourself, too) are up-to-date on new QC techniques. If not, study some of the literature, attend technical QC meetings, and discuss these methods with experienced men. Quality controlling, like other phases of industrial activity, is a constantly changing science—each year it becomes more capable and more complex. The company which does not keep up with progress will find itself left behind in both quality and cost of product.

Literature References

No attempt has been made to list the many fine books and articles bearing on quality control and its application to specific problems or areas. However, the following are a few selected texts which the authors believe worthy of study by the control executive and his technical assistants.

(1) Shewart, W. A., *Economic Control of Quality of Manufactured Product,* D. Van Nostrand Co., Princeton, N.J., 1931. By no means light reading, but a "must" for the career quality director and stimulating for the scientific-minded executive.

(2) Juran, J. M., *Management of Inspection and Quality Control,* Harper and Bros., New York, 1945. Largely aimed at the machine and assembly industries and unfortunately now out of print. However available in most libraries and still up-to-date in many of its ideas.

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Coming Soon . . .

Application of Switchgear to Rubber Plants—By R. N. Wilson and F. C. Timberman, Allis-Chalmers Manufacturing Co., Milwaukee, Wisc.

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Automation of Goodrich Flexometer Testing—By A. F. Cody, Enjay Laboratories, Linden, N. J.

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Testing Synthetic Rubber Coated Diaphragms in Automotive Air Brakes—By E. W. P. Smith, Bendix-Westinghouse Automotive Air Brake Co., Elyria, Ohio.

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Vulcanization of

Polysiloxanes:

Accelerated Electrons and High Temperature Ambients

By D. J. FISCHER and V. FLEGEL
Dow Corning Corporation, Midland, Mich.

THE purpose of this work is to study individually and simultaneously the effect of intensity and temperature on the efficiency of vulcanization by accelerated electrons and to compare these treatments with the effects of equivalent Co^{60} irradiation. In a previous paper on gamma vulcanization of polysiloxanes *(1)* the effects brought about by the removal of air and post-irradiation heating to activate residual sites suggests using a simultaneous environment of high temperature and intensity to obtain a more efficient process of establishing cross-links. High intensities should give greater efficiency if the rate of applied energy for producing cross-links is large compared to the rate of diffusion of air into the sample, since the presence of air can inhibit the primary cross-linking mechanism.

Experimental Techniques and Results

The polymer-filler mixture was compounded on a two-roll mill. The formulation contained 62 parts of a reinforcing fume silica with 100 parts of 0.142 methylvinyl and 99.858 mole per cent dimethyl siloxane copolymer. In addition to the filler and copolymer, additives were incorporated to give maximum heat stability and to eliminate crepe hardening.

A two mev Van de Graaff with beam currents from 62.5 to 250 microamperes was used for accelerated electron irradiations, while a Co^{60} source was used for the gamma treatments. The procedure for determining the dose on the latter followed the prescribed specifications in ASTM D-1671-59T.

Dose determinations for the accelerated electrons were calculated from the voltage and intensity (current) of the electrons impinging upon the sample. This value was then corrected for the distribution of energy absorbed based on the density and thickness of the sample as discussed by Trump, Wright and Clark *(2)*. The dose unit was the rad, which is the absorption of 100 ergs of energy per gram of material. Separate dose measurements at low beam currents using ferrous sulfate, Fricke Dosimetry *(3, 4, 5, and 6)*, were in good agreement with the dose values calculated from voltage and beam current data.

The most probable error in the above dosimetry is approximately five per cent with a maximum error in any one measurement of ten per cent.

A high temperature chamber ⅜ inches by 3½ inches by 6¾ inches was designed and constructed with a thin aluminum top so that electrons could pass efficiently down and through filled polymer samples approximately 0.050 inches thick. The temperature in the chamber was regulated by thermocouple type Wheelco Controller and continuously measured by a Varian Recorder. Air was not excluded from the radiation vulcanizations conducted in this chamber.

The degree of vulcanization was determined by measuring the physical properties of the vulcanizate on an Instron testing apparatus. A grip separation speed of two inches a minute was used for each sample.

Two tensile values are used in this report. One is based on the initial cross-section and the other on the reduced cross-section. The latter T_B can be calculated from the former T_1 and the maximum per cent elongation E using the following equation:

$$T_B = \frac{(100 + E)}{100} T_1$$

Modulus values, M, were obtained from the stress values taken on the initial pull at 50 per cent elongation, T_{50}.

$$M = \frac{T_{50}}{\left(a - \frac{1}{a^2}\right)}; a = \frac{E}{E_o} = 1.5$$

TABLE I — AMBIENT TEMPERATURE EFFECT ON INCREASING CROSS-LINKING EFFICIENCY OF ACCELERATED ELECTRONS

Temperature (degrees C.)	Change in Modulus Per Unit Dose (psi units/Megarad)
40	21
145	27
200	36

Use of this modulus will be confined to determining the total cross-linking level in the irradiated samples. Previous work by Warrick and Lauterbur *(7)* has shown this modulus to be directly proportional to the total number of cross-links in a vulcanizate.

In order to establish whether an intensity effect exists with accelerated electrons, samples of the silica filled siloxane copolymer were irradiated using 62.5, 125 and 250 microamps beam current at a constant level of total dose. The results in terms of modulus for each of these intensities in three different temperature ambients are plotted in Figure 1.

These modulus data show that the total number of cross-links produced in each of these samples at the same ambient temperature are essentially equivalent over this four-fold variation in intensity.

In Figure 1, a significant difference is observed in the total number of cross-links established as a function of the ambient temperature. The samples irradiated at 200°C. have almost twice the number of cross-links as those samples which have been treated at 40°C.

In order to determine the effect of high ambient temperatures more quantitatively, a series of samples were irradiated at three temperatures throughout a range of 0.1 to 2.0 megarads. Graphs A, B and C of Figure 2 show the values of tensile strength, per cent elongation and modulus as a function of dose for these temperatures. In addition to the expected trend of the physical properties with increasing dose, the tensile strength at 0.2 megarads for the 200°C. treatment is significantly greater than the values obtained at the lower temperatures.

The modulus values, except at low doses, are linearly related to the absorbed energy. The slopes of these curves, listed in Table I, show the relative efficiency of cross-linking as a function of temperature.

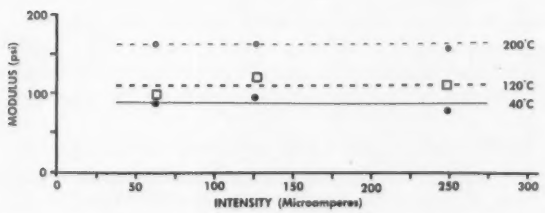

FIG. 1—Intensity and temperature effect with accelerated electrons at 4.0 Megarads.

The data in graphs A and B of Figure 2 can be used to calculate the maximum tensile strength based on the reduced cross-section at break. A plot of these values in Figure 3 also shows a significant temperature effect. The peak in the tensile strength at break for the 200°C. irradiation is as low as 0.7 megarads while the peaks for 145 and 40°C. treatments are above 2.0 megarad. The position of this peak at 0.7 megarads comes at a much lower value than the 6.0 megarad dose obtained on the corresponding polymer when it was treated with gamma radiation *(1)*.

Comparison of Two Irradiations

Accelerated electrons appear to be more efficient in producing cross-links than gamma radiation. Therefore samples of the same formulation were treated with both high energy sources using a controlled ambient temperature of 40°C. Graphs A, B and C of Figure 4 show how the physical properties vary as a function of dose. Each one of the properties shows that at constant dose (based on absorbed energy) a greater degree of vulcanization is obtained when accelerated electrons are used.

A comparison of the modulus at 10 megarads shows that the total number of cross-links established in the samples treated with accelerated electrons is three times the value obtained from the gamma treatments.

The tensile strength at break for both irradiations

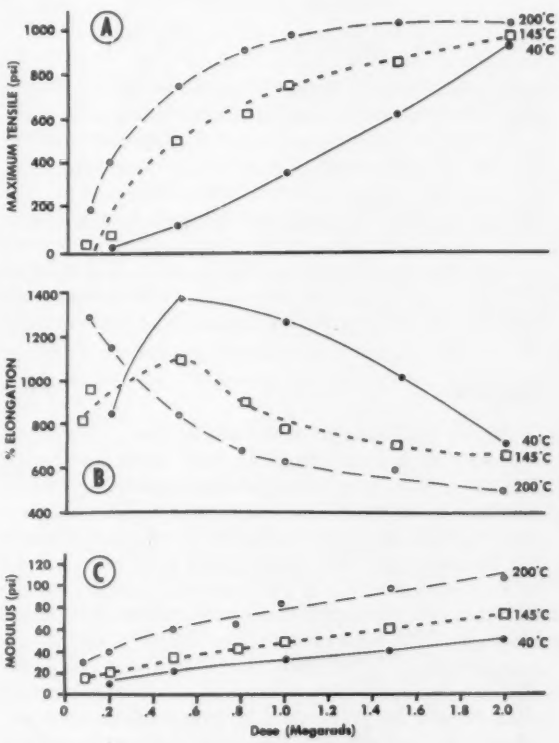

FIG. 2—Temperature and dose effect with accelerated electrons at 63 microamperes.

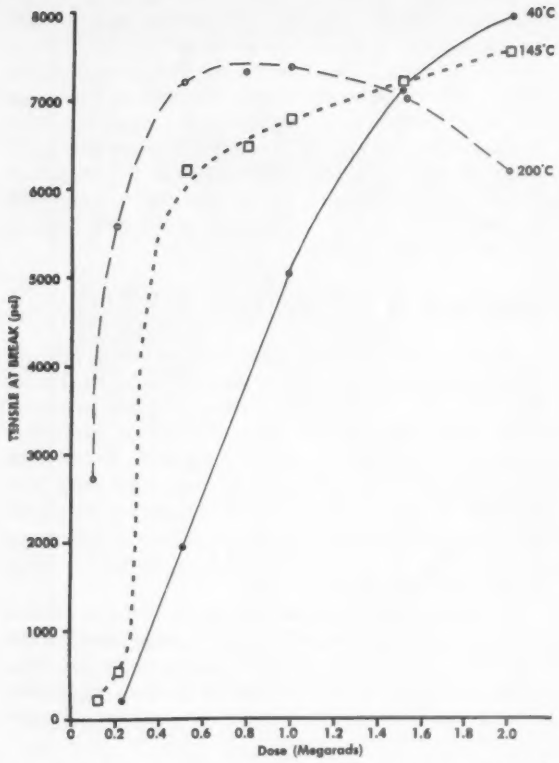

FIG. 3—Effect of temperature on tensile at break, accelerated electrons at 63 microamperes.

when plotted as a function of dose (Figure 5) gives a maximum value at 2.0 megarads for accelerated electrons with a similar peak at 6.0 megarads for the gamma ray treatment. These results also show that accelerated electrons have a three-fold greater efficiency for vulcanizing this polysiloxane formulation.

A slight difference in the magnitude of the peak tensile strength at break appears to exist. It is difficult to believe, however, that this is a true effect, since both irradiations were conducted in a 40°C. environment.

Discussion

Earlier studies on intensity effects from gamma rays *(8)* showed that for the same dose equivalent cross-linking levels were obtained throughout a 55-fold variation in intensity. This work with accelerated electrons complements the intensity effects observed with the gamma rays. The approximate dose rates for the two sources were 2.1 x 10^{-4} megarads/second for the gamma and 54 megarads/second for the accelerated electrons. The ratio of these two ranges of intensity is approximately 1:250,000. If it is assumed that intensity effects do not exist between these experimental data ranges, the greater vulcanization efficiency possibly may be explained by a localized temperature effect. The point of application of accelerated electrons experiences an energy input which can give rise to a

TABLE II—EFFECT OF HIGH TEMPERATURE AMBIENT (0.2 MEGARAD)

Temperature (degrees C.)	Tensile Strength At Break (psi)
40	200
145	500
200	5500

local temperature increase. In a 40°C. ambient, a 0.050 inch silica-filled polysiloxane sample experiences a momentary local temperature increase above 160°C. when it passes under a 63-microampere beam (single pass) for 10 megarads.

The independent data of Lewis, Lake, and Lawton *(9)* support the concept that accelerated electrons can give efficient vulcanizations at low doses. Their maximum tensile strength at break for a 1 x 10^6 roentgen dose applied to both sides of the same sample was 4870 psi for a 45-part filler loading in polydimethylsiloxane. A similar tensile strength at break was obtained in a 40°C. ambient at approximately 0.9 megarads for a 62-part silica loading in a dimethyl, methylvinyl siloxane copolymer using a single pass through the beam. If allowance is made for the difference in filler loading, polymer composition and applied voltage of the sources, it seems that equivalent results were obtained with these two accelerated electron-producing machines.

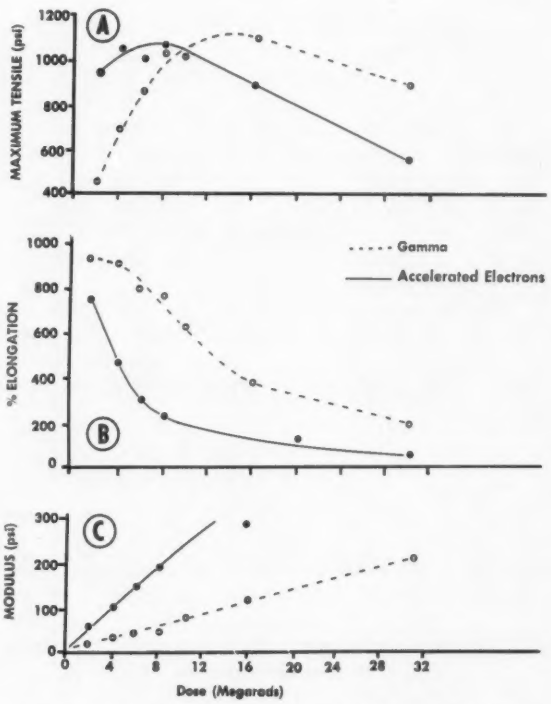

FIG. 4—Physical properties with gamma and accelerated electron irradiations in 40°C. ambient.

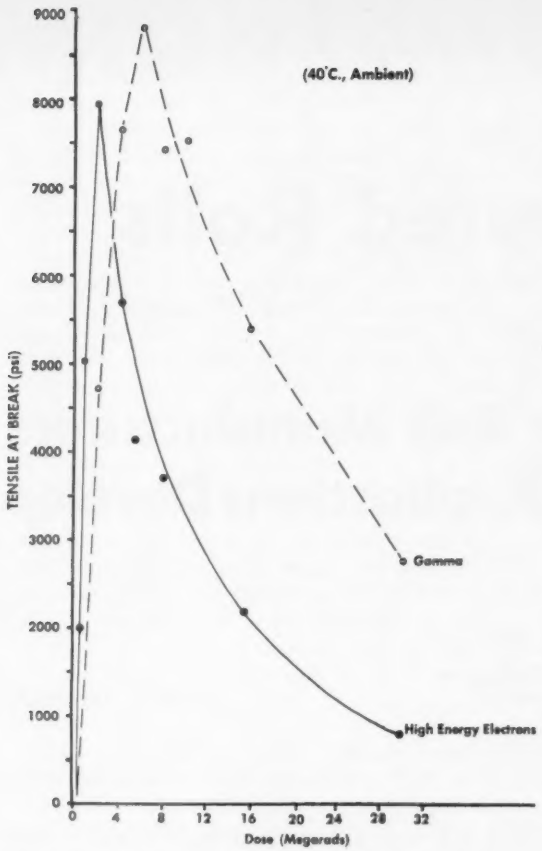

FIG. 5—Tensile at break with gamma and accelerated electron irradiations in 40°C. ambient.

The utilization of high temperature ambients for greater cross-linking efficiency can be considered a separate effect from that of localized heating. Part of the high temperature ambient effect comes from the distillation or evaporation of volatile impurities from the sample. Such impurities come into existence during the milling operation for preparing the elastomer. This operation causes air and moisture to become part of the formulated stock. It also causes some breakdown of high molecular weight polymer to small units. The effect of removing these unwanted additives by high temperature ambients can be seen in Table II. The treatment at 200°C. gives a tensile strength at break which is 27-times greater than the value obtained at 40°C.

Another contribution from the existence of a high-temperature ambient such as 200°C. involves the immediate utilization of the radiation-induced residual sites found to be formed during gamma irradiations *(1)*.

An additional experiment was conducted to support the general premise that high-intensity accelerated electrons have advantages over lower-intensity gamma irradiation. Silica filled polytrifluoro-propylmethyl-siloxane could not be vulcanized well when treated with gamma rays unless the samples were placed in a vacuum *(1)*. High-intensity accelerated electrons do vulcanize this same formulation to give good physical properties without the aid of a vacuum. These high intensities must produce cross-links before air can diffuse into the sample to cause its direct or indirect effect in inhibiting vulcanization.

Summary

Variations in the vulcanization of polysiloxanes per unit dose were not observed within the range of intensities available with the gamma and accelerated electron sources. The ratio of the magnitudes of the two ranges 1:250,000 is very significant. The higher-intensity range along with the localized heating effect gives cross-linking rates which are much greater than the rate of diffusion of air into the sample. Such minimization of the air-inhibitor effect gives a greater number of cross-links per unit dose.

Different temperatures show appreciable effects as measured by modulus, tensile strength and per cent elongation. The temperature effects observed in this report are two-fold: one, indirect effect due to localized heating by a high intensity beam; two, direct effect from a general high-temperature environment

A three-fold greater efficiency of accelerated electrons over gamma irradiations in 40°C. ambients was observed for this particular copolymer formulation. An additional two-fold increase in cross-linking efficiency was obtained by increasing the 40°C. ambient to 200° C.

The over-all effect of the simultaneous environment, accelerated electrons and 200°C. ambient, is reflected in the 0.7 megarad optimum for tensile strength at break (T_B) while 6.0 megarads were required with gamma radiation.

ACKNOWLEDGMENT

The authors wish to acknowledge the assistance of Dr. David E. Harmer and George J. Atchison of the Dow Chemical Company for their respective supervision of the Gamma and Accelerated Electron Irradiations. We are also indebted to Dr. E. L. Warrick of the Dow Corning Corporation for his assistance as a consultant in radiation technology.

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Rubber Covered Rolls

New Opportunities for Roll Manufacturers Evident as Many New Applications Develop

By John E. Hyler

John E. Hyler & Associates,
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ALMOST every day manufacturers are discovering new uses for rubber covered rolls. From steel mills and rugged machine feeding to the ultra-gentle handling of delicate products, conveyor rolls covered with rubber do the job best. This unprecedented demand has increased supplier interest. Both synthetic and natural rubber rollers find wide application in the paper industry, including wallpaper manufacture, and in the textile industry. In the foil-converting field, in packaging, and in tanning operations, rubber-covered rolls have come into wide use.

Methods for bonding rubber coverings to steel roll cores have been highly developed by different roll manufacturers. Some of these provide synthetic rubbers of various types, including neoprene, nitrile, styrene rubber and hard rubber. Others have specialized largely in providing rubber covers for rolls which incorporate silicone rubber, Hypalon, and other materials that provide good service under temperature, pressure and wear extremes.

Development of Specialists

It is interesting to observe how various firms become specialists in the rubber-covered roll field. Some, for instance, are particularly adept in producing such rolls for business machines, including both platens and small rolls for difficult applications. Others developed fine facilities for producing many types of specially-ground surfaces on rubber-covered rolls.

Most rubber-covered rolls are ground to a smooth finish in a very efficient operation. Generally, where rubber rolls are of sufficient size to require crowning, crowns can be produced to close specifications. Such a grinding setup differs greatly from the large volume, mass production grinding of small rubber rolls. Business machine rolls, and particularly those used on typewriters, are sometimes handled on cylindrical grinders, provided with hopper feed, automatic loading, and automatic ejection.

Grinding-wheel Specifications

Grinding-wheel specifications vary with different finishes required and type of rubber being handled. Application of rubber-covered rolls to grinding machines constitutes an interesting study. As in other grinding applications, experienced engineers can usually supply the solution to individual grinding problems.

A typical and yet interesting application of rubber rolls is in the carpentry industry. Versatile rollers help size flush doors to net width and trim doors on both ends to net length, at a single pass, on two Greenlee double-end machines. Rubber-covered rollers accelerate forward travel of each door into the hopper, allowing the following door to run out over it without interference.

Still another application of versatile rubber rollers is shown in Figure 1. Here, a Cardwell automatic feeder is arranged at the infeed of a modern eight-drum, double-deck Solem sander. The lowest panel

in the feeder is always in proper height registration with the sander infeed, as a rubber covered roll pulls the bottom plywood sheet from the automatic feeder and passes it directly to the sander.

Yet another interesting use for rubber rolls is spreading adhesives, finishing materials, and the like, on flat stock. Rubber rolls did not come into use for spreading adhesives until after the advent of resin glues. Consistency of these adhesives, and necessity for applying only a light spread, made it impractical to use anything other than resilient rolls for the purpose. A typical glue spreader of the resilient roll type, shown in Figure 2, is built by the Black Brothers Company of Mendota, Illinois. It applies a thin and uniform spread, regardless of any small irregularities existing in surfaces of veneers and other materials being spread.

Resiliency of the rubber-covered rolls allows the roll surface to conform to any slight surface irregularities, so there are no "skips" in slightly-low spots. Since their first appearance, these spreaders have been greatly improved. Various types of synthetic rubber are employed in roll covers, so rubber used will not be attacked by solvents in the adhesive utilized in the process.

Mating and Doctor Rolls

Each rubber-covered application roll has a mating steel roll, covered with chromium, which runs very closely adjacent to it, and sometimes in actual contact. This chromium-covered roll, referred to as a doctor roll, has a highly-sensitive horizontal adjustment toward and from the mating rubber-covered application roll. Its position in reference to the application roll governs thickness of the adhesive coating applied. A certain advantage is obtained by running the doctor roll at a different surface speed than the application roll, obtaining a sort of wiping action between the two rolls. Normally, the surface of the application roll travels faster than that of the doctor roll. However, in spreading very thin adhesives or finishing materials, the doctor roll is sometimes adjusted into actual contact with the rubber-covered application roll and travels at the same speed.

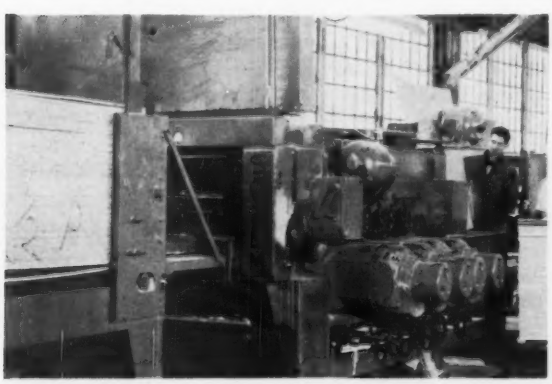


FIG. 1—Rubber-covered roll pulls bottom plywood sheet from Cardwell automatic feeder and passes it directly into modern Solem sander.

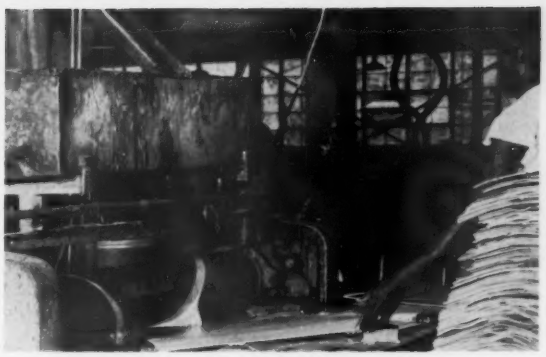


FIG. 2—Glue removed from application roll and left on surface of veneer is clearly seen on Black Brothers glue spreader.

When a machine is meant for spreading very thin material exclusively (for example, certain thin finishing materials) the surface of the application roll is ground perfectly smooth. In all other instances, it is grooved annularly, the grooving taking the form of a helical threading.

Rubber rolls are available from manufacturers in differing Durometer hardness specifications. Generally, both rubber-covered rolls used on a spreader have the same degree of hardness, but this is not always the case. As an example, one machine for spreading filler material on hardboard has both rolls covered with Neoprene, but the top one has Durometer hardness of 35 to 40, while the lower one has hardness of 65 to 70. Hardness can be tailored in any case to a specific duty to be performed.

Uses with Laminates

Rubber rolls are also employed for imparting pressure, when combining laminated materials. In a rotary press, laminate are first glue spread and laid together, then run between the two rubber-covered rolls of the press. Necessary pressure is applied to the top roll through two air cylinders. Rubber-covered rolls are particularly valued where laminated plastic is being used as a facing ply, since rubber rolls never disfigure surfaces in any way.

On both glue spreaders and rotary presses, of course, length of rolls and effective width of the machine are practically synonymous. Some machines are made with very short rolls, for processing narrow stock exclusively. However, both glue spreaders and rotary presses are available through a full range of widths, extending up to a maximum of 170 inches.

Other objectives can be attained through the use of rubber-covered rolls, and there are other methods of use than those referred to in this article. However, it is believed that this discussion is fairly representative of the present uses of rolls. It is hoped that further thinking will be stimulated about rubber roll potentialities.

Teflon-Asbestos Cups Solve High Heat, Sealing Problems

A molded asbestos piston cup impregnated with Teflon, developed by Raybestos-Manhattan, Inc., Passaic, N. J., is said to improve the economy and efficiency of automatic tire presses, increase machine operating life, reduce maintenance, and eliminate a costly machine lubricating system. The cup was developed for the National Rubber Machinery Co., Akron, Ohio.

In the press, the green tire is automatically loaded in a mold. As the mold closes, a rubber bladder is inflated inside the green tire under steam and pressure. The closed mold forms the outside of the tire and tread design. The rubber bladder, forced against the inside of the tire by air pressure, holds the tire to form the proper internal configuration. After vulcanization, the rubber bladder is pushed out of the finished tire by a "bag ram and cylinder head" assembly (Figure 1). As one tire is removed, another green tire is placed in the mold and the process is repeated indefinitely.

Metal Used Formerly

Previous to adopting R/M cups, NRM used metal piston rings for the ram and cylinder assembly. The metal ring assembly required a lubrication system for proper functioning. As air was delivered to the cylinder—to start the ram and cylinder down to remove the bladder from the finished tire—it passed through a lubricator. Occasionally, the lubricator would introduce fluid oil into the cylinder. As lubricants are injurious to tire rubber, it was desirable to devise a design that would not require lubrication. Other operating problems were friction and adhesion. Drag on cylinder walls, after shut-down for the week-end, caused excessive wear on moving parts. Even when new and unworn, metal rings did not provide the best degree of sealing, while the Teflon-Asbestos cups provide good seals.

FIG. 1—Bag ram, cylinder, and cylinder head assembly is inserted into mold frame of tire press.

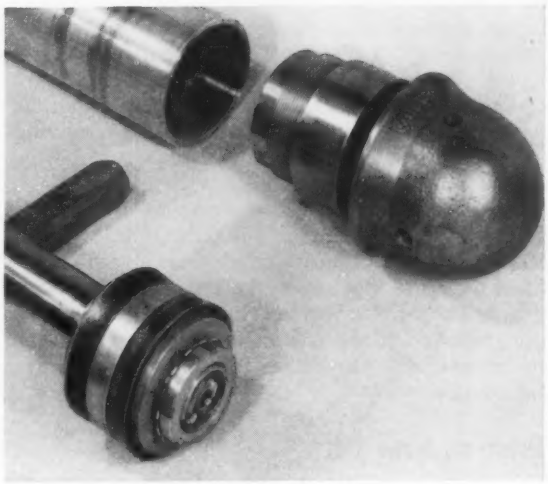


FIG. 2—Double-cup arrangement is shown at end of piston rod (left); ram, cylinder, and cylinder head (right) move over cup and piston rod.

Nearly a year of research, testing, and engineering collaboration between R/M and NRM was necessary to develop the cup, R/M Number 1550 (Figure 2), presently used in NRM tire presses. Piston cups are used in a simple, back-to-back, double-acting cup arrangement. The cups operate at temperatures up to 500°F., provide negligible friction at all pressures, do not require lubrication, and have high resistance to extrusion. Prior to final approval and adoption, R/M cups were tested under production line conditions on six presses in a Goodyear plant in Topeka, Kansas.

Two major benefits result from use of the cups. The lubrication system formerly required with the metal rings is eliminated, and the air losses formerly experienced are reduced. A concurrent benefit to customers is the leveling of sudden peaks in maintenance schedules, caused by unexpected need for replacement of rings in tire presses. Maintenance overload due to this replacement has been virtually eliminated.

EDITORIAL

A New Frontier for Additives?

► The continuing disagreements over the implications of the Food Additives Amendment to the rubber industry may finally be settled if actions taken by the Rubber Manufacturers Association are fruitful. The Industrial Products Division of RMA has asked the Food and Drug Administration to issue a regulation approving as "safe" the thousands of rubber products which the rubber industry makes for the food and beverage industries. It will be remembered that when the food additives law was broadened in 1958, the Food and Drug Administration was charged with the responsibility of seeing to it that ingredients utilized in the manufacture of such end items as conveyor belting, hose, gaskets, etc., were safe.

As the law was drawn, however, more confusion than clarity resulted. Some went so far as to suggest that every compounding ingredient involved in the production of conveyor belting, for example, had to receive some form of governmental clearance if that belt were to be used—say—in a candy factory. It became apparent to many that if this was the way in which the law was to be interpreted, the cost of producing the conveyor belt would be prohibitive. Many chemical suppliers went so far as to suggest that if they were to be held to this interpretation, they could not profitably continue to operate within the rubber industry.

The rubber industry has now conducted literally thousands of tests to determine whether properly manufactured products could or would contaminate the food being handled. The recent RMA petition to the Food and Drug Administration unequivocally states that "No known tests reveal any effect on food, nor, indeed, even the presence of any residue of the food handling product in the food . . ." In an attempt to cooperate fully with the government in the protection of all citizens, RMA has submitted a list of basic rubber chemicals and suggested compounding and testing standards. The Food and Drug Administration may approve the list in a regulation, or it can amend it after consultation with industry.

The rubber industry has a long history of cooperation with government in a wide variety of matters. The industry's devotion to the public welfare is a matter of record and needs no further elaboration here. The government, for its part, must provide reasonable safeguards for the health and safety of all citizens. Once there is assurance, however, based upon 'thousands" of tests, this matter of public safety becomes something less than a focal point. What is a point of contention, is unwarranted interference in the operation of business.

We urge the federal authorities to give every consideration to the RMA petition. It strikes us as singularly unfair that since 1958 the rubber industry and its chemical suppliers have been forced to operate under a cloud which by implication suggests that the industry is less than cognizant of the dangers of chemical contamination of foodstuffs. It is to be hoped that the "New Frontier" will take a new look at this matter so that not only the general public is served but the rubber industry as well.

Ten Tight Money Tips

Both the small businessman and the financial tycoon may profit from this advice on buying and selling

► While political partisans debate the relative merits, or demerits, of "tight money," "high interest," or whatever you call it, millions of small businessmen (and some who are not so small) are faced with the problems of managing their operations so as to stay comfortably liquid (it has nothing to do with your supply of spirits, but a lot to do with your spirit) all the time.

Stripped of all the persiflage, the problem is to keep enough long green, cabbage, lettuce, spondulas, or whatever you call dollar bills, so that in case of special emergencies you always have enough on hand for foreseeable needs. Maybe the expression that a man is liquid, when he has plenty of money to meet expenses, came about because most businessmen enjoy a drink *only* after they are sure they can pay for it *and* their bills.

There is no way for anyone to tell anyone else exactly how to handle his money, without knowing his individual hopes, fears, obligations, assets, and potentials. But there are some pointers that every businessman might keep in mind in days of hard-to-get-adequate-credit when-you-need-it-most. These ten tips are not given in order of importance. Perhaps one man needs the last tip more than he needs the first, depending upon his own economic situation. But it is possible that a thorough consideration of *all* these points—in the context of today's puzzling economic picture—may be useful to lots of small businessmen who are overlooking one point or another. In any case, here goes with the advice. Remember, as the Small Business Administration warns, cash is vital in any business and it is particularly vital in small businesses.

(1) Soft-pedal credit sales in every legitimate and sound way. Encourage your customers, by signs, by bill-slips, or in clerk-to-customer talks, to pay cash for their purchases. Some 65 per cent of all retail business (all chain grocery business, for example) *is* done on a cash basis. The big companies that offer unlimited credit may be able to afford to do so. But for you, a small businessman, who may be crimped for funds, it is certainly the time to encourage cash payments.

Incidentally, you might even build up a better and bigger business, everything considered, by "going to cash" in your sales. You can offer a cash discount, which is certainly warranted, to those who are hesitant about buying for cash. Sooner or later, the cash-paying public in this country is going to demand a cash discount on everything, anyway, for they realize that they are paying both for their own purchases and to help carry the credit of credit-buyers.

(2) If you are in a business that almost demands some extension of credit to customers, do the next best thing and bill promptly. Let's say you are in the appliance or plumbing business. You know that a man who calls you on a repair job that costs $75 is not likely to have so much cash between paydays. But you can't afford to carry him a day longer than necessary. Get all you can in cash and be sure that the bills go out on the first day of the month. I have had plumbing repair work done. The bill would not come for two or three months. A year or so later, I would see the fellow who owned the plumbing company. He would be working for someone else. He never realized that the *use of money* was the most vital part of a business. He failed to get his money in as fast as he could, and he couldn't pay his own help. So he went into bankruptcy.

If *you* are suffering with the shorts, and are wondering why, you might find that the big reason lies in your own credit extension practices, and the failure of a stenographer to get those bills out promptly—and addressed to the right address.

(3) If tight money is squeezing you, make up a true list of your assets. Study this list at various times. Think about it again and again. Do you own a choice piece of property "extra"? Do you have two or three cars at home? Why not re-examine

your list of assets to see which ones you can sell at the highest possible price? You may kill two fat birds with one stone by selling certain real estate, or other properties, you may own. You may also get rid of a continuing expense item (taxes, etc.) and you may better your present cash position to ease the pressure.

(4) Study better methods of inventory control. Remember, any item that sits on your shelves long enough to gather dust is similar to having money in a sock, becoming mildewed, while you are suffering a cash pinch. Put on a sale and jettison all the stuff that has sat there for a long time. It is not only tying up shelf space, it is immobile money, maybe not a lot, but some. Besides, you should study your sales to be familiar with what is moving fast and what is dragging. Get more of the fast-moving items and get rid of the slow moving ones.

If you are really squeaking due to lack of grease, make an arrangement with the wholesaler or distributor to give you more frequent service. Don't keep as many items of a specific kind in stock, but keep close to the telephone, ordering the replacements you need. In this way, you keep as little of your capital tied up on actual goods as is possible. If a customer wants to leave the money and pick up the item in two days, don't hesitate to take it and his or her order. This is like money from home. Remember the old saying—"An anxious customer and his money are soon parted."

(5) Put off paying your own bills, as long as you legitimately can do so, without jeopardizing your credit. If a bill is due on the 10th, but you are given a 30-day grace period without penalty, then pay it on the 28th or 29th day during the grace period. This gives you a little more time to collect your own money, to use it, and maybe even make some more, before you *must* pay the other bills. Many small businessmen have gone broke, boasting about how fast they paid their bills—*before* they ran completely out of cash! The important thing is not so much paying at once, as it is to pay within a reasonable time, *and to stay in business.* If you use the correct managerial policies on your handling of accounts, those you collect and those you pay, you'll be able to squeak through when others fail.

(6) Go over your business operations, every phase of them, every month, with the view of cutting out all the fat. If you are really tight for money, go over your home-bills with your good spouse and cut out the frills there, too. When you go over the outlays, take the small ones into account as well as the large ones. But don't be penny-wise and pound foolish. A lot of small businessmen—who *should* read and think about business operations—actually start out economizing by cutting off this or that subscription to a business magazine. This is the height of shortsightedness, as any good businessman will verify. The amount of information you can get from reading is incalculable. Although it costs little, it is priceless. But you can still cut items that return very little, if anything, for the sums invested. You also might discharge employees who are costing you money by their own slovenly habits, or their inability to make money for you while on the job. *Poor personnel fritter away more money than they ever could be worth to many a small business.*

(7) Make an inventory of your hours and work-habits, as well as a list of your assets. Are you getting as much out of a day as you should? If not, examine your own practices, with the view of getting more rest at night, going perhaps to fewer civic functions at noon, and devoting more time and study to your business. *Time is money.* This is a bromide. But it is a lead-pipe cinch bromide that many a small businessman overlooks — to his peril. If you save some hours by sloughing off unproductive activities, you can make these "extra hours" count by using them to good effect.

(8) Sell all the time, at work, at play, at coffee-time, at rest, on the telephone, and everywhere. I once played golf with a dentist. As soon as he would meet a foursome, he would go up and introduce himself, identify himself as a dentist and tell where he was located. I have never known him to want for a full house at his office. He is a rich man today. I knew another dentist who played golf at the same course. He was as quiet as a mouse. You could play golf with him all year and never learn he was a dentist, unless you asked him what he did for a living. Alas, he has never moved from the same poor neighborhood. He kept his profession a secret, and, of course, he never found the secret of success, which is *selling all the time.* If you are suffering from "tight money," it probably means you are suffering from a lack of sales. The way to remedy the situation is to *sell more,* and the way to do this is to learn how to sell all the time you are awake, in all phases of your activities. Incidentally, if you don't like to sell, and don't know enough of the techniques to learn how to sharpen them, what in the world are you doing in the business, anyway?

(9) If in going over your accounts receivable, you find lots of money owed to you that is overdue, then get in touch with those who owe you and try to collect. If this is not possible, on a reasonable basis, take their notes payable. With these notes receivable, you may be able to go to the bank and get cash for them at a discount. Money owing to you, that you can't collect immediately, is the same as goods on your shelf that you can't sell. You would jettison the goods, in a sale, to get the cash back, wouldn't you? Well, do the same thing with the notes receivable. Let the buyer collect them over a period of time, while you *use* the cash. Just the opposite, if you have large bills that you know you cannot pay, then go to your supplier and tell him that you will sign a notes payable. This is the businesslike way to do business, if you are short. It indicates to him that you have no intention of skipping town, or taking a last resort. You have confidence in your future. Your creditor will have more confidence in you, because of your own confidence.

(10) Watch more closely the expenses which you can deduct, for tax purposes. In long years of advising small businessmen, I have observed that many seem to think that all men, who do the same amount of business, pay the same amount of taxes. Nothing could be farther from the truth. By the careful keeping of a day-book, keeping account of all the little sums that dribble out from any businessman's pockets, some businessmen deduct literally thousands of dollars more each year than others who may even seem more extravagant. The reason is that little things mean a lot, and little expenses surely mean a lot. If you are at your place of business and someone calls you—on business—to come to his place of business, you have a right to deduct the trip, even if it is only a few miles. If you have to go to a postoffice six miles away to make sure a bill is paid on time, or to mail out your bills, the trip is deductible. Keep account of all such things, writing them down each night, after business.

If you follow these ten tips, you will get some other good ideas about how to husband cash. If you will just *think* about the problem every day, you'll come through "tight money" with cash to spare. The politicians can't keep a good man down, or boot him out, if he is *determined* to stay in business.

NEWS REPORTS

and industry activities

FEBRUARY, 1961

RMA Asks FDA Ruling On Rubber Products

▶ The Rubber Manufacturers Association has petitioned the Food and Drug Administration to issue a regulation approving as safe the thousands of rubber products made for use by the food and beverage industries. When the food additives law was broadened in 1958, the FDA was charged to see that products used in food handling—hose, belts, gaskets—were safe. In line with this ruling, the rubber industry has conducted tests to determine whether properly manufactured products could or would contaminate the food being handled.

The RMA petition, supported by detailed exhibits covering several hundred compounding materials, extractability test procedures, and voluminous data on extraction and migration tests, states that: "no known tests reveal any effect on food, nor, indeed, even the presence of any residue of the food handling product in the food handled."

The petition lists nearly 500 materials used in the making of rubber products employed by the food and beverage industries, including elastomers, accelerators, retarders, activators, protective agents, plasticizers, fillers, pigments, lubricators, emulsifiers, and a number of other miscellaneous compounding ingredients, and states maximum permissible quantities of each by weight.

The RMA brief also notes that: "the various food handling products of the rubber industry are compounded from a limited list of ingredients by elaborate and complicated technical processing equipment procedures. These procedures are carefully controlled and safeguarded and are subject to constant testing to insure the health and safety of the public whose food they handle."

The petition mentions that the ingredients used in these products have been the subject of an extension of the Federal Food, Drug and Cosmetics Act, and that the ingredients listed in the petition are the same as those published in the *Federal Register* of September 1, 1960, with modifications.

Paper Making in Malaya

▶ According to reports from Kuala Lumpur, Malaya, the nearly five million tons of rubber wood a year, now used as fuel in Malaya, may form the basis of a paper making industry. Rubber wood is a term given to rubber trees which no longer yield latex in economically feasible quantities. Experiments have shown that rubber wood makes a short fiber, and for pulping it would have to be mixed with bamboo and lallang grass. The replanting of Malayan rubber estates is said to insure a steady supply of rubber wood.

Extraction Studies

Heavily supported with extraction studies, the petition holds that the results of these studies, conducted independently in various rubber manufacturers' laboratories, indicate that the total extractables resulting from reasonably foreseeable use of food handling products are so infinitesimal as to defy identification by the most sensitive, modern scientific procedures.

The RMA list of basic materials to be used and suggested compounding and testing standards may be approved by the FDA in a Federal regulation, or the FDA may seek to amend it after study and consultation with representatives of the Special Rubber Industry Committee on Food Additives.

▶ Goodyear Tire & Rubber Co., Akron, Ohio, estimates that sales of its flooring products in 1961 will be increased by at least 17 per cent over the previous high.

General Cable Cited In Antitrust Suit

▶ The U.S. Government filed an antitrust action on January 19 in Federal Court in New York City charging the General Cable Corp. with lessening competition by acquiring, since 1955, nine corporations engaged in the wire and cable business or related activities. In another suit, the Government charged the American Smelting & Refining Co. with lessening competition in the copper industry because it holds controlling shares in General Cable and Revere Copper & Brass, Inc.

In its action, the Government described General Cable as the largest producer of copper and aluminum wire and cable in the United States. According to the Government, General Cable's assets in 1959 were $130 million and its net sales were listed as more than $170 million.

The Government's suit contends that acquisitions of the following companies by General Cable were unlawful:

General Insulated Wire Works in 1955; New England Cable Co., Clifton Conduit Co., Clifton Conduit Co., Inc., and Alphaduct Wire & Cable Co. in 1956; Metal Textile Corp. in 1957; Hathaway Patterson Corp. in 1958; and Cornish Wire, Inc., and Indiana Steel & Wire Co., Inc. in 1959.

According to the suit, the effect of the acquisitions was to eliminate competition in the electrical wire and cable industry.

In its action against American Smelting, the Government stated that of General Cable's 13 directors, six were also directors of American Smelting. In addition, the chairman of American Smelting was also chairman of General Cable. The Government contends that a similar situation exists in regard to Revere Copper, with American Smelting placing five of its directors on Revere's 13-man board of directors, and also a dual chairmanship.

United Carbon Plans Venezuelan Black Unit

► A $3 million carbon black plant with an initial rated capacity of 20 million pounds per year will be built in Venezuela by the United Carbon Co., Houston, Texas. The new plant will be located in Valencia, the site of three of the four tire manufacturing facilities in Venezuela. Currently, Goodyear Tire & Rubber Co., U.S. Rubber Co., Firestone Tire & Rubber Co., and General Tire & Rubber Co. have manufacturing plants in the South American country. United Carbon de Venezuela, C.A., a new corporation, will operate the plant, and Dr. Luis Ignacio Mendoza has been named president of the company.

The facility is expected to be completed in late-1961, and will produce six major types of furnace blacks: HAF, ISAF, FEF, GPF, HMF, and SRF. According to the company, it will be able to offer one-day delivery to all the rubber manufacturers in Venezuela since they will be within a 75 mile radius of the site. In addition, when the plant goes on stream it will increase current production of South American carbon black manufacture by 40 per cent.

United Carbon has obtained a credit of $1.4 million from the Export-Import Bank of Washington, a Government agency, for use by its new affiliate, United Carbon de Venezuela. Funds from this credit will be used to finance the acquisition of United States equipment for the carbon black plant in Valencia. The United Carbon credit is repayable to the Export-Import Bank over a period of four years beginning in 1963.

In addition to United Carbon, other stockholders in the Venezuelan firm are: Manufactura de Papel, C.A.; Inversiones Dosco, S.A., and Grupo Tecnico de Promocion Industrial, C.A.

Interchemical Buying Firm

► Interchemical Corp., New York, N.Y., has announced plans to purchase Landers Corp., Toledo, Ohio, for approximately $2,500,000 in Interchemical stock. Landers manufactures plastic coated fabrics, and its stockholders have approved the transaction. Terms of the agreement call for an exchange of about 63,000 shares of Interchemical common stock for Landers common.

J. S. Corrigall

E. S. Kern

Vanderbilt Promotes Two

► R. T. Vanderbilt Co., New York, N. Y., has announced the promotion of J. S. Corrigall to executive vice-president and E. S. Kern as sales manager of the Rubber Chemicals Department. Mr. Corrigall has also been elected to the board of directors of the company. He attended Trinity College School, Port Hope, Canada, and McGill University in Montreal. Mr. Corrigall started his association with R. T. Vanderbilt in June, 1944, and has been in charge of the Rubber, Petroleum, Export and Fungicide Departments for the past six years. Mr. Corrigall assumed his new responsibilities at R. T. Vanderbilt on February 1.

Mr. Kern joined the company in 1932. He was a technical sales representative for ten years and since that time has served in various capacities on administrative sales matters in the New York office. Mr. Kern is a chemical engineering graduate of the University of Missouri and was associated with Goodrich prior to joining R. T. Vanderbilt. He is a past-chairman of the New York Rubber Group.

SORG Christmas Party

► The Southern Ohio Rubber Group held its 14th Annual Christmas Party on December 10, 1960, at the Miami Valley Country Club, Dayton, Ohio. Over 100 couples attended the annual affair which included dinner and dancing, door prizes, and favors for the ladies.

The Southern Ohio Rubber Group has elected the following officers and directors for 1961: *President*, Howard G. Gillette (Precision Rubber Products); *Vice-President*, E. N. Ipiotis (Inland Mfg.); *Secretary*, John H. Woodward (Inland Mfg.); *Treasurer*, Donald R. Strack (Inland Mfg.); *Directors*, F. W. Gage (Dayton Chemical Products), Harold Schweller (Inland Mfg.), D. L. Allen (Minnesota Mining & Mfg.), C. Bellance (Inland Mfg.), R. Heist (Dayco), R. L. Jacobs (Premier Rubber), M. K. Coulter (American Zinc Sales), J. West (Union Carbide), H. S. Karch (C. P. Hall), W. F. Herberg (Dow Corning), J. M. Williams (American Mineral Spirits); *Permanent Historian*, Russell Hoskins (Inland Mfg.); *Membership Chairman*, Frank Falvey (DuPont); *Auditing Chairman*, Malcolm Everett (Precision Rubber Products).

New RTV Silastic

► A free-flowing fluid silicone rubber that is said to vulcanize in sections of unlimited thickness at room temperature has been developed by Dow Corning Corp., Midland, Mich. The company states that the new rubber, designated Silastic RTV 601, requires only the addition of a catalyst and 24 hours' time to set up into a rubbery solid. After vulcanizing for 24 hours at about 77° F., parts or sections made from Silastic RTV 601 can be put into full service at temperatures from —100° to +500°F.

Goodyear Spending $80 Million in 1961

► An $80 million capital expenditure program in 1961 for Goodyear Tire & Rubber Co., Akron, Ohio, was disclosed by E. J. Thomas, board chairman, in a talk on January 31 before the Beaumont Chamber of Commerce in Beaumont, Texas. He stated that the 1961 figure is $5 million more than 1960 expenditures, and brings to more than half a billion dollars Goodyear's total capital investment since 1955.

In predicting continued national growth and expansion in 1961, Mr. Thomas cited Goodyear's new synthetic rubber unit in Beaumont, scheduled for completion in the Fall of this year, as a symbol of the firm's faith in the future. The importance of the new facility, which will produce 20,000 tons a year each of polybutadiene and polyisoprene, is defined by the fact that the planned 40,000 ton annual production is comparable to the annual yield from 150,000 acres of rubber trees.

According to the Goodyear chief executive, the firm's polybutadiene rubber, called Budene, will be used as a partial replacement for natural rubber, and its polyisoprene rubber, called Natsyn, is a total replacement for natural rubber. Mr. Thomas expressed the opinion that the ability to produce, within the United States, all the rubber needed, will have two enormously important results. The first, he said, will be the near elimination of the violent price fluctuations of natural rubber which have plagued the rubber industry since its beginning. The second result is complete independence of foreign sources of rubber for the United States and the rest of the free world, if necessary.

Continuing his stress on the important role synthetic rubber will play in industry, Mr. Thomas related that consumption of synthetics swelled from 3,000 tons in 1940 to over one million tons in 1959. Synthetic rubber, which accounted for only a fraction of a per cent of the total rubber consumption 20 years ago, now amounts to about 70 per cent of the total, he said.

In addition to predicting continued expansion and growth of the nation, Mr. Thomas said that Goodyear's future looks equally bright. He pointed out that the firm sold more than a billion dollars worth of its products for the first time in 1951 and passed $1.5 billion in 1959. He added that the company might have a good chance of hitting $2 billion by the mid-1960's.

One of the indices on which the company bases its confidence in the future is the expected increase of 33 per cent, or 400,000 long tons, in the use of synthetic rubber in the United States between 1960 and 1965, he said. Another factor, he pointed out, is the increase in passenger car registrations with 62 million registered in 1960 and an estimated 82 million by 1970.

K. J. Morray

Silicone Sales Manager

► K. J. Morray has been named sales manager of the Silicone Products Department of General Electric Co., Waterford, N. Y. He succeeds T. J. March who has taken a new post as manager of sales operations of G-E's newly-established internal automation operation in Schenectady, N. Y.

Mr. Morray will be responsible for 14 G-E sales offices throughout the United States. He is a graduate of the University of Chicago with a B.S. degree in chemistry and, prior to joining G-E in 1949 as a field sales representative with the Silicone Products Department, had been associated with the U.S. Rubber Co. and the Barrett Division of Allied Chemical & Dye Corp. From 1951 to 1953 he served the department as a sales development specialist.

Mr. Morray transferred to the Chemical Materials Department in 1954, serving as a sales and product planning specialist. In 1957 he returned to the Silicone Products Department as manager of the east central sales district with headquarters in Cleveland, Ohio.

Goodrich-Gulf Polybutadiene Unit

► A multi-million dollar facility for the commercial production of Ameripol CB *cis*-polybutadiene synthetic rubber is being built at Institute, West Va., by Goodrich-Gulf Chemicals, Inc. According to the company the facility is expected to be in operation by the end of 1961, with an initial output of 20 million pounds annually.

The construction of this synthetic rubber facility follows the *cis*-polybutadiene licensing program initiated by Goodrich-Gulf in August, 1960. At that time the company offered to license the manufacture of "stereo specific" rubbers under its patents together with sub-licenses under pertinent catalyst patents held by Prof. Karl Ziegler. The company reports that it has granted licenses to two synthetic rubber producers and negotiations are continuing with a number of other synthetic rubber producers, both in the United States and overseas.

Goodrich-Gulf claims that its test results indicate that Ameripol CB is the only known polybutadiene rubber which can be used as a 100 per cent replacement for natural rubber in heavy-duty tire treads. Over 5 million test miles have been logged on Ameripol CB tire treads, the company states, with improvement in tread life up to twice that of natural rubber.

According to Goodrich-Gulf, another outstanding advantage of its *cis*-polybutadiene is that it can be processed very readily on conventional fabricating equipment. This factor, the company said, is a result of its pre-processing technique, which is being made available to licensees and is to be incorporated in the new manufacturing facilities.

Ameripol CB has a number of other qualities, the company claims, which suggest its use in other applications. These are: good electrical properties combined with good abrasion resistance which can provide coverings for electrical wires that are subjected to mechanical wear, and good flex properties suggest its use in power transmission belting and in conveyor belting.

► Paul A. Dunkel & Co., Inc., Jersey City, N. J., reports that it now has available naturally pure gum arabic in production quantities. The product is designated CP Gum Arabic.

Twenty-Four Papers Presented At Ninth Annual Wire Symposium

▶Twenty-four papers were presented at the Ninth Annual Symposium on "Technical Progress in Communication Wires and Cables," held on November 30 to December 2, 1960, at the Berkeley-Carteret Hotel in Asbury Park, N. J. The three-day meeting, sponsored by the U.S. Army Signal Research & Development Laboratory, was attended by 925 persons. Howard F. X. Kingsley (USASRDL) served as symposium chairman, and F. W. Wills (USASRDL) was co-chairman. Also on the symposium committee, were: R. Blain (U.S. Army Signal Engineering Agency); C. T. Wyman (Bell Labs); I. T. Stoneback (ITT Labs); H. L. Wuerth (Goodrich Chemical); R. P. Houlihan (Gavitt Wire & Cable); and S. Montgomery, Jr. (Montgomery Co.).

Mr. Kingsley reports that the tentative dates for the Tenth Annual Wire & Cable Symposium are November 29 and 30, and December 1, 1961. W. P. Acton (Hercules Powder) and R. L. Spade (Belden Mfg.) have been named to the 1961 Committee, replacing Mr. Stoneback and Mr. Wuerth.

The three-day meeting was officially opened by Col. H. McD. Brown, commanding officer, U.S. Army Signal Research and Development Agency, Fort Monmouth, N. J.

In addition to the technical sessions, other features of the three-day meeting were a hospitality hour, which was attended by over 800 of the delegates, and a banquet, attended by over 350 persons.

Abstracts of the 24 papers presented follow:

A Present and Future View of the Field Army Wire and Cable Requirements, by Major D. T. Patterson (U. S. Army Signal Corps). The battlefield of today and tomorrow is discussed in terms of mass destruction weapons and widely maneuvering forces. The threat and promise posed by these battlefield conditions requires a communications system of some sophistication to enable the commander to exercise his control by using a system that embraces the following criteria: dispersion; flexibility; reliability; high capacity; high quality; and mobility. Improved and wholly compatible wire and cable facilities, concurrent development of splicing techniques and tools, simplified and improved testing techniques, and better installation and recovery methods are all areas that must be considered by the wire and cable industry and the military in concert, of the art of providing communications over wire media in keeping abreast of the changing concepts related to the army in the field.

Four-Wire Field Wire, by M. J. Malinowski and R. H. Cranmer (USASRDL), S. Lamberton (General Cable), and Mrs. L. C. Platau (formerly of USASRDL). The purpose of this paper is to describe in brief the development of a new four-wire field wire for military use. Despite the miniaturization required to achieve maximum mobility, field wire must provide reliable electrical performance and be sufficiently rugged to withstand combat and environmental conditions. The wire must be capable of indefinite storage or use anywhere in the world. It must be capable of being payed-out at high speeds by military ground vehicles or aircraft and must give satisfactory service when laid on the ground, installed on poles or trees, laid in ditches or across roads or bodies of water. It must be of such construction as to permit rapid repair and splicing using standard lineman's tools. Laboratory tests and limited field tests by USASRDL and the General Cable Corp., indicate that WF-16( )/U, the proposed four-wire field wire, compares favorably with WD-1/TT, the two-wire field wire now in use, in over-all performance.

Developments in 300-600 Volt Miniature Flexible Insulated Lead Wire For Use at 700°-2000° F., by Welton D. Parker (Rockbestos Wire & Cable). Consideration of a flexible insulation to operate more than a temporary overload interval at temperatures above 700° F. leads to a search for materials having temperature characteristics at levels above those of polytetrafluoroethylene and the silicones. By the exisiting nature of things, such materials must be inorganic. At the present state of the art, many applications require compromises between the more critical features of the requirements and such balance or combination of performance characteristics as can be built into the wire. Continuing developmental activities include consideration of new conductor materials, inorganic matrices and impregnants, impervious flexible and rigid outer coverings and compatible terminations.

The Power Rating of Teflon Coaxial Cables at Extreme Environments, by E. T. Pfund, Jr. (Electronic Specialty Co.) and P. S. Klasky (United Electrodynamics). A great quantity of test data has been accumulated concerning the operating capabilities of certain MIL-approved coaxial cables and connectors under conditions of power transfer, altitudes to 80,000 feet, and temperatures from —300° to +1000° F. Over 2,000 feet, of mircofilm was employed to document the work accomplished. This work was conducted at an accelerated rate and resulted in extension of knowledge of Teflon cable operation at temperatures above 400° F. and below —100° F. A "brute-force" technique suitable for determining the life index of rf cables, connectors, and related components, regardless of size, was employed. The method is, of course, applicable to all type of rf cable, regardless of size, and provides the user with a considerable amount of practical information on cable operation at environment, including VSWR and surface temperature measurements versus time. Finally, it is shown that certain solid-copper sheathed, solid-Teflon dielectric cables are not reliable at temperatures as low as 410° F., some 72° below the industry-accepted, conservative, long-term Teflon cable operating temperature, due to the thermal expansion of the dielectric creating inner stresses sufficient to rupture the outer jacket.

Polymer Requirements and Insulating Techniques for Obtaining the Maximum Benefits of High Density Polyethylene, by R. J. Ettinger (Goodrich-Gulf). Quality wire extrusions can now be made from high density polyethylene. Only the very high molecular weight polymers should be used for this purpose. If these data are compared with published data on other electrical grade plastics, it appears that high density polyethylene insulations have stress cracking and thermal lives which are much superior to other electrical grade plastics. These life properties, while outstanding in themselves, can be further improved by the use of a suitable antioxidant and/or channel black. By following the techniques outlined in this paper, it is possible to reduce the processing problem often encountered with these polymers.

Wire Jackets of Nylon: $R = k(pq) + (ec)^x$, by E. C. McKannan and R. E. Shaw (DuPont). Nylon jackets are specified for a majority of hook-up wires, especially those which are to be bundled, cabled, clamped or forced into close spaces. A thin jacket of nylon provides an extra large measure of resistance to damage by abrasion, cutting and scraping action. It also provides resistance to attack from hydrocarbons, heat and fungus in the environment. These properties become more important as control and communication systems become more complex and miniaturized. The equation suggested in the title is based more on experience than on rigorous mathematics. It is a shorthand expression which says that reliability is dependent on polymer quality of the wire coatings and, to an even greater extent, on the extrusion techniques used. The discussion presents the reasons for this statement. It also summarizes the engineering care which is required of material suppliers and wire coaters to provide reliable wires.

Simultaneous Extrusion of Polyethylene and Polyvinyl Chloride Coatings on Electrical Conductors, by G. E. Henning (Western Electric). The facilities de-

Col. H. McD. Brown (center), commanding officer, U. S. Army Signal Research & Development Agency, Fort Monmouth, N. J., opens the three-day 9th Annual Wire & Cable Symposium, with Howard F. X. Kingsley (left), chairman, and Fred Wills (right), co-chairman, at the Berkeley-Carteret Hotel, Asbury Park, N. J. (U. S. Army Photograph).

scribed in this paper can be used for the same plastic in two different colors. They can be used where two entirely different plastic materials are employed, such as polyethylene and PVC. Two or more conductors can, of course, be coated simultaneously, if the need arises. Moreover, either extruder can be operated entirely as a separate unit by simply inserting the proper tool assembly. The space occupied by the multicoat extrusion facilities, in terms of product turned out, is only about half of what would be required if two separate operations are employed. Substantial operating economies over conventional equipment will result through reduced scrap, maintenance, and the more efficient utilization of labor.

New Low-Loss "Balloon" Type Polyethylene Insulation for Telecommunication Cables, by G. Fuchs and P. Verges (Société Anonyme de Télécommunications, France). A number of methods are used towards reducing the effective permitivity factors of polyethylene-air dielectrics, such as polyethylene string wound at a wide pitch round the central conductor, discontinuous disc insulation, cellular polyethylene, etc. The purpose of the present paper is to describe a process developed by our company several years ago, which ensures very low permitivity factors hand in hand with high dielectric strength and good mechanical resistance. Process control is easy and accurate, and uniform results can be obtained throughout an indefinite series of batches. The insulation obtained is referred to in France as "tubular balloon insulation" or more briefly, "balloon insulation." The term is descriptive of the final result, which is reminiscent of a string of small balloons attached together. The insulation is attained by extrusion around the conductor of a polyethylene tube with an inner diameter that is greater than the wire section; the conductor is centered in the tube by "crimps" at regular intervals.

Construction Details and Processing Methods of Geophysical Cables, by C. P. McKenna (Vector Mfg.). One of the basic tools of the geophysical industry is the seismic detector or geophone. This is a compact but extremely sensitive pick-up device which receives the direct and reflected signals of an elastic wave generated by a dynamite blast and passes them along as electrical impulses to a special multiple galvanometer recording camera, and/or tape recording equipment. The geophones are used in various patterns, arrays of spreads made up of 48 to as many as 1500 detectors and distributed over 15 to 25 acres in area. These spreads are picked up and laid down as often as 15 times a day in surveying open country. To achieve this mobility and speed requires a combination of specially designed components such as power driven takeup reels or a device known as a "cable squirter" and a system for attaching and detaching the numerous geophones to the lead-in cable at contact points known as "takeouts." This paper discusses the latter portion of the operation.

A New Anti-Twist Armored Submarine Cable, by G. Palandri, P. G. Priaroggia and R. Monelli (Pirelli, SpA, Italy). The cables of the anti-twist type became important in the last few years following the extensive development of communications by means of submarine cable, including repeaters. The use of rigid repeaters made the laying problems more cumbersome, showing clearly the advantages which could be gained with the adoption of anti-twist cables. In this report the construction data and the mechanical characteristics of an anti-twist armor sheath for deep sea cables are illustrated. The armor consists of steel strands, parallel with one another and with the cable axis, embedded in a polyethylene sheath. The results of the tests carried out on this cable are also given.

Unarmored Submarine Cable for Deep-Sea Carrier Telephony, by A. L. Meyers (Submarine Cables, Ltd., England). Soon after the completion, in September, 1956, of the first transatlantic telephone cable system it became apparent that the rapid increase in telephone traffic would necessitate the early provision of additional cables. Previously, radio circuits had been used for transatlantic telephony, and the improvement in quality and reliability with cable circuits greatly encouraged public demand. An unarmored type of deep-sea coaxial cable, with the strength member inside the inner conductor and an external plastic sheath, was proposed in 1951 by the British Post Office to Submarine Cables Limited. It gives increased circuit capacity and permits the laying of repeaters in rigid housings for two-way operation. After development and trials, the new cable was chosen for the deep sections of the Canadian transatlantic telephone cable, due for completion in 1961, as the first link in a proposed Commonwealth system around the world. This paper describes the advantages, development, and manufacture of the cable, and reviews future possibilities.

Cable Splicing Utilizing New Silicone Materials, by R. E. Kincaid (Dow Corning). Every time an electrical wire or cable is spliced, materials used to insulate the splice must display properties equal to or better than those of the original cable insulation. Many of the splice insulating materials used today achieve this end at the cost of many man hours of skilled labor and extremely complicated splicing techniques. Many of these products require a good deal of skill in preparation or application; some lack properties which would make them ideal splicing materials; some are quite limited in use. Presented in this paper are new silicone materials which appear to lend themselves to simplified techniques for electrical cable splicing. Extremely easy to handle and apply, these new materials produce splice jackets with properties comparable to or better than the cable insulation itself. The cost of making these silicone insulated splices is about half that of the more complicated splicing systems and competitive with the poured plastic splice insulating systems.

New Fluorocarbon Insulation Compounds, by W. L. Gore (W. L. Gore & Associates). While PTFE (Teflon) possesses nearly all the attributes of an ideal material for wire insulation, there are a few respects where improvement is desirable. One of these is in plastic flow. Another characteristic needing improvement is resistance to abrasion. When corona discharge is set up against a PTFE surface, the discharge penetrates through the material, resulting in an insulation failure. Where high voltage stresses are encountered (or moderate voltage stresses at high altitude) improvement is needed in the corona life of PTFE insulations to provide the nearly absolute reliability required in many complex electronic systems. Several new compounds and wire constructions of PTFE have been developed to extend further the use-conditions under which this material can be used and reliable performance obtained.

An Adapter to Improve the Sensitivity of the Q Meter for Dielectric Loss Measurements of Polyethylene, by L. A. Rosenthal and Thomas Hazen (Union Carbide Plastics). At the present state of the art, the dielectric properties of polyethylene low loss materials can best be measured using the benzene cell technique. Unfor-

tunately in this measurement, the low dissipation factor taxes the resolution of the Q meter when used for these measurements. Although the G meter offers sufficient resolution, this unit is no longer available commercially. A device, which can be adapted to a Q meter to increase its resolution by a factor of about five, has been developed. In addition to being a differential voltmeter, the adapter can inject a variable conductance into the Q meter circuit. This paper is divided into two parts. In the first part, the theory and design of the G adapter will be presented. The second part will describe certain experimental measurements that were performed using the developed instrument.

An Improved Oven for Accelerated Aging of Polyvinyl Chloride Compounds, by R. M. Sherwood and S. J. Boronski (Monsanto Chemical). Since plasticized polyvinyl chloride first was used for electrical wire insulation, it has been necessary to perform some type of accelerated aging test to determine the maximum continuous operating temperature which a particular compound could withstand without experiencing excessive loss of mechanical strength and flexibility. An extended test is satisfactory for "qualification" purposes, but it is unsatisfactory for day-to-day operations. Therefore, it is often necessary to replace or to supplement the long-term test with a short-term test. Unfortunately, a switch to short-term accelerated aging often is accompanied by side effects. Variations in oven aging due to variations in air velocity past the samples seem to become more pronounced at higher temperatures, particularly for thin wall constructions. It is with variations in accelerated aging caused by variations in oven air velocity that this paper is concerned.

Coax Cable and Shielded Wire Terminations, by M. N. Brown (AMP, Inc.). Extended use of higher and higher frequencies and the need for background noise reduction indicate a vastly expanded need for coax cable and shielded wire. The presentation will indicate some of the current techniques and latest methods of terminating this type of cable and wire. AMP has developed complete families of terminations for the most popular cable and wire ranges, and is developing more product families to cover the majority of other requirements. In all cases, an AMP solderless connection is produced by fast-acting, cycle-controlled tools (either hand or machine) which provide measurable quality control and high performance. All AMP coax cable terminations also feature simultaneous center conductor and braid crimps with one stroke of the tool, resulting in the very lowest installed cost for this type of termination. Products are grouped and discussed separately in this report.

Silicone Compound Development and Quality Control Through Use of the Mooney Viscometer, by R. M. Savage (General Electric). Rubber compounders in the field of product development, quality control people, and rubber fabricators alike, must always be concerned with the rheology and processing characteristics of the rubber and plastic stocks with which they work. Of particular interest is an understanding of, and means of measurement of, the viscosity or plasticity of the stock to be used. For our purposes we shall think primarily in terms of use for extruded wire and cable insulation, although the considerations are applicable in some instances to other means of fabrication. The Mooney viscometer as discussed in this paper is well suited for studies of silicone rubber viscosity, and as you may see from the data it serves yet another useful purpose—providing information on curing studies.

Degradation of Polymers by External Corona Discharge, by R. F. Grossman (Anaconda Wire & Cable). Corona, the ionization of gas (usually air), induced by a voltage gradient, and leading to a discharge current of ionized particles, is known to damage dielectric materials on which it impinges. In the case of many useful polymers, this damage is apt to be severe, and results in the rapid deterioration of the polymer's dielectric properties. If the polymer is in service as electrical insulation, sustained corona discharge eventually produces direct failure. The mechanism of this action is incompletely understood. It has been variously ascribed to ionic bombardment, electron bombardment, ozone attack, and localized heating. Two observations, the fact that corona discharge in air is known to generate ozone, and that corona attack of elastomers produces surface cracking, have given rise to the belief, common to the rubber and plastics industry, that ozone attack is the sole factor involved. It will be shown that this hypothesis alone cannot account for all of the experimental observations.

Heat Aging Studies of Chemically Cross-Linked Polyethylene, by A. E. Tarbox (Union Carbide Plastics). Chemically cross-linked polyethylene is being introduced to industry as a new material. While this vulcanizate based on polyethylene and medium thermal black has become of interest chiefly to wire and cable manufacturers during the past few years, it has more recently generated interest among rubber fabricators. It is generally well known that chemically cross-linked polyethylene and its compounds have good chemical and stress-crack resistance, high tensile and tensile impact strength, and improved dimensional stability at elevated temperatures. In the area of high temperature service, however, there has been little specific information available on the retention of properties of these compounds. This paper discusses the effect of heat aging on some of the more critical properties of chemically cross-linked polyethylene.

High Density Polyethylene Insulation in Communication Cables, by J. Vincent McBride (Plastic Wire & Cable). The new high density polyethylenes offer extraordinary mechanical advantages in addition to the superlative electrical properties that have been typical of polyethylene for the past 15 years. Broad new horizons are being opened for polyethylene in the communication field as a result of remarkable developments in its design and manufacture. This creates problems of proper choice and adequate specifications for particular applications. Whereas other commonly used thermoplastic insulating and jacketing materials, such as polyvinyl chloride, could have a wide range of physical and electrical properties depending upon the formulation, polyethylene was considered in its earlier days, 10 to 15 years ago, as a reliably consistent standard material with unvarying superlative electrical characteristics. This was due to the fact that a touch of antioxidant was the only modification of the standard base resin which was produced through a high-pressure, high-temperature, process. This made the writing of specifications for polyethylene relatively simple.

Some Recent Studies of Electrical Grade Fillers in Butyl Rubber and Other Insulation Materials, by W. F. Fischer (Enjay Labs). Established long-term performance and processability of butyl high voltage insulation is currently based on the use of calcined clay as the major mineral filler. Continued research on other mineral fillers has disclosed that a select type of filler, platy talc, imparts markedly higher dielectric strength to butyl insulation compounds. Compared to clay and Whiting fillers, average dielectric strength is increased from 700 to 1200 volts per mil which suggests the use of thinner walled cable insulation. Over-all processing and physical property data on platy talc compounds detailed in the paper show no significant deficiencies in comparison with calcined clay, calcium carbonate and other types of talc fillers in butyl rubber. A one-step mixing procedure for butyl-platy talc compounds is described.

Irradiation Induced Elastic Memory of Polymers, by V. L. Lanza and Paul M. Cook (Raychem Corp.). The effect of ionizing radiation on polymers has received considerable attention over the past several years. Particular emphasis has been placed on the study of cross-linked polyethylene for wire and cable as well as other applications. One of the most interesting and novel applications has resulted from a study of the irradiation induced elastic memory of polymers. A typical example is the work that has been done with polyethylene. A most interesting feature of irradiated (cross-linked) polyethylene is that it behaves as a semi-crystalline polymer below its crystalline melting point, and as a rubber above its crystalline melting point, due to the irradiation induced three-dimensional gel network. It is possible to irradiate (cross-link) polyethylene in the solid state to form a three-dimensional gel network and then deform (i.e. expand or contract) polyethylene parts in the molten state. The deformation is accomplished because of the rubber-like extensibility and strength of the polymer when molten. It is then possible to freeze the particular part in the deformed state resulting in a stable configuration due to recrystallization of the polymer. This stable configuration will persist until the polymer is reheated to a temperature above its crystalline melting point, whereupon the polyethylene part will return to its orginal pre-determined dimension. The unique combination of plastic-rubber-like properties permits one to use irradiated polyethylene in many and varied forms where crystalline melting through heat causes the polymer part to return precisely to its original cross-linked geometry.

The Application of Electrical Cable to Missile Systems, by G. H. Morgan (Douglas Aircraft). Electrical cables are a vital part of any missile system. They are used to carry the signals that control, monitor, test and fire the missile. The reliability of the whole system is dependent on the reliability that is achieved in these interconnecting cables. The cable manufacturer can build reliable cable but unless the system designer selects the proper cable to fit the application, this reliability may not be attained. The system designer must select cable to satify many requirements but two basic uses are involved. It must be for either fixed or portable use. Most of the early missile systems were small mobile types and thus, portable types of cable were generally used.

Production by Autogenous Extrusion, by A. N. Gray (Consultant). According to theory and confirmed by observations on the part of many investigators, the output of an extruder rises in direct proportion to an increase in screw speed and if there is an upper limit, it has not been reported by anyone. There is, of course, an upper limit as well as a lower limit on stock discharge temperature for each plastic material with which we are concerned. The presently available band of screw speeds, if used in conjunction with the safe temperature limits of the particular plastics involved, appears to cover practically the whole range of plastic insulated wire products currently manufactured. This paper has been prepared with the hope that interest in this system of operation will be sufficiently stimulated to cause other investigators to explore the possibilities. It has been demonstrated that the system can be used competitively with the conventional system so far as output per unit is concerned with all the advantages of simplified operation. The problem of increasing outputs to hitherto unattainable levels can then be solved to the great benefit of the industry in general.

L. A. Wohler

Named By Firestone

► Leonard A. Wohler has been named manager of latex sales for Firestone Synthetic Rubber & Latex Co., Akron, Ohio, succeeding E. H. Ketner, who has resigned. The company also has appointed D. E. Auten as a sales representative.

Mr. Wohler received a B.S. degree in chemistry in 1932 from Wittenberg University, and studied at the University of Gottingen in Germany as an international exchange student from 1932 to 1933. He joined Firestone in 1935, working in latex research. From 1938 to 1945, he was engaged in product development at the Fall River, Mass., plant, working on foam rubber, rubber thread, gas masks and other products. Mr. Wohler returned to Akron in 1945 as a group leader in latex research, and in 1949 was appointed to the general research management staff as technical coordinator for latex.

Mr. Auten joined Firestone in 1927 as a cooperative student and in 1931 became a member of the college training class. He holds a M.S. degree in mechanical engineering from the University of Akron. Mr. Auten had been engaged primarily in sales until his appointment as manager of tractor tire engineering in 1944. He became a senior sales engineer in the Development Department in 1946, was named project engineer for coated fabrics and plastics in 1951, and project engineer for plastic, fiber and adhesive studies in 1956. He joined the Fibrocast Division in 1958 and transferred to the Synthetic Division in 1960.

Philadelphia Officers

► The Philadelphia Rubber Group has announced that its officers for 1961 are: *Chairman,* Richard N. Hendriksen (Phillips Chemical); *Vice-Chairman,* Richard M. Kerr (H. K. Porter); *Secretary-Treasurer,* H. F. Smith (Naugatuck Chemical); *Executive Committee,* H. C. Remsberg (Carlisle Tire & Rubber), E. C. Brown, Jr. (Goodyear-Chemical), K. E. Chester (C. P. Hall), R. E. Connor (Quaker Rubber), W. J. Macomber (U. S. Rubber), K. F. Quinn (Moreland Corp.), B. Van Arkel (R. T. Vanderbilt); *National Director,* R. A. Garrett (Armstrong Cork).

On November 4, 1960, the group held its Annual Fall Dance at the Manufacturers Country Club in Oreland, Penna. According to reports, the affair continues to be a success and was thoroughly enjoyed by all who attended.

Petrochemical Complex In Argentina

► A $70 million petrochemical complex to supply Argentina's major needs for synthetic rubber, as well as benzene and chemical intermediates, is being built at San Lorenzo, Argentina. The facility, first of its kind in Argentina, will be financed and constructed by Petroquimica Argentina S.A., an Argentine company owned by five United States industrial corporations. They are: U.S. Rubber Co., Witco Chemical Co., Continental Oil Co., Cities Service Co., and the Fish International Corp.

The Argentine Government gave its approval to the project two weeks after the Texas Butadiene & Chemical Corp. withdrew its plans for building a synthetic rubber plant in Argentina. The company, which had been attempting to gain government permission to build for the past two years, states that it has withdrawn from the project due to economic, financial and technical reasons. According to reports, its main reason was its inability to make financing arrangements for $39 million.

The petrochemical complex will consist of nine inter-related plants and will include two synthetic rubber plants; catalytic reformer and alkylation units for producing motor fuel and aviation alkylate for the Argentine Government, and benzene for chemical manufacturing, and three chemical facilities to make butadiene, styrene, and chemical intermediates. Both butadiene-styrene and *cis*-polybutadiene synthetic rubbers will be manufactured, and the entire synthetic rubber output will be available to Argentine rubber products manufacturers.

Completion of plant units are scheduled at intervals ranging from 18 months for the simplest units to 36 months for the more complex installations. At full capacity, the complex will produce annually some 32,000 tons of butadiene, 14,000 tons of styrene, 45,000 tons of synthetic rubber, and 11,500 tons of chemical intermediates. It will also produce 850 barrels daily of benzene.

► Stockholders of Rubbermaid, Inc., Wooster, Ohio, have voted to increase the authorized number of shares of common stock in the firm from 1,500,000 to 2,500,000.

Detroit Hears Panel On Synthetic Fibers

► "Properties and Applications of Some New Synthetic Fibers" was the subject of a panel discussion held by the Detroit Rubber and Plastics Group on October 7, 1960, at the Wolverine Hotel in Detroit, Mich. Dr. Philip Weiss (General Motors) served as panel moderator. Topics under discussion included: "Dacron Polyester Fiber" by W. H. Jamieson (DuPont); "Polyolefin Fibers" by John B. Cornwell, Jr. (Reeves Bros); "Saran Polyvinyl Fibers" by E. D. Serdynsky (Dow Chemical); and "Acrilan Acrylic Fiber" by John Barrows (Chemstrand).

In his discussion on Dacron, Mr. Jamieson remarked that in stress-strain properties Dacron polyester fiber has an initial modulus about twice that of nylon, thus, where resistance to stretch is an important factor in end use applications, Dacron possibly could fill a need. He compared Dacron with other fibers when wet, and pointed out that it remains unchanged while nylon properties are lowered slightly, and rayon properties are reduced noticeably.

Mr. Jamieson pointed out that high modulus is one of several properties that has made Dacron an important factor in the reinforcement of V-belts. The speaker informed the group that evaluation is now under way on Dacron polyester fiber as a reinforcing material for tires. Dacron still is in the experimental stages in this application, he added, but its good balance of properties could make it an important factor in the future.

Polypropylene Fiber

Mr. Cornwell's remarks dealt with the properties and applications of polypropylene fiber. He pointed out the pertinent properties of both monofilaments and multifilaments, and discussed the ultraviolet stabilization of these fibers in relation to some of the other fibers. Mr. Cornwell concluded his remarks with a discussion on the end uses of the fiber, covering the present and future.

Mr. Serdynsky explained to the group that Saran is defined as a generic term, applied to a series of compounds, or resins, in which vinylidene chloride is the major constituent. He discussed the several steps in the production of Saran textile fibers, and pointed out that although Saran filaments can be dyed, the normal coloring procedure is by pigmentation.

The crystalline nature of Saran, he stated, is developed in the extrusion fabrication process, and the filaments are oriented by mechanical stretching to develop tensile strengths adequate for a textile fabric. According to Mr. Serdynsky, Saran monofilament fabrics have found major application markets as automotive fabrics, outdoor furniture webbing, shade and screen cloth, and filter fabrics.

New Connecticut Officers

► The Connecticut Rubber Group has elected its new officers for 1961. They are, left to right, seated, *Chairman*, Frank B. Smith (Naugatuck Chemical) and *Vice-Chairman*, Alexander Murdoch, Jr. (Armstrong Rubber); standing, *Treasurer*, Frank Villa (Whitney Blake) and *Secretary*, Rial S. Potter (Spencer Rubber). Vincent P. Chadwick (Armstrong Rubber), publicity chairman of the Connecticut Rubber Group, reports that the 1961 meeting dates for the group are: February 17, May 19, September 9 (Outing), and November 17.

On December 9, 1960, the Detroit Rubber and Plastics Group held its Annual Christmas Party at the Hotel Statler Hilton in Detroit, Mich. The evening's activities included dinner, entertainment, and the awarding of door prizes.

► The Silicone Products Department of General Electric Co., Waterford, N. Y., is offering bulletins CDS-188, a specifications guide for users of silicone rubber, and CDS-179, on the use of General Electric silicone rubber for lead wire insulation.

Tyrex Test Claims

► Tyrex, Inc., New York, N. Y., association of Tyrex tire cord producers, claimed at the American Trucking Association Convention that in tests conducted in over 5 million tire miles of commercial operation in South Texas, Tyrex had showed a 47.2 per cent tread mileage over comparable nylon truck casings. The tests, started last year, were run on trucks of the Ray Smith Associated Companies, Dallas, Texas. According to Tyrex, at 81,714 miles the Tyrex cord tire had 62 per cent of the original tread depth at the crown while the nylon tire was worn to 35 per cent, in testing the performance of Tyrex and nylon tires. The organization also reports that in tests run for over 100,000 miles, the nylon tire was ready for recapping while the Tyrex cord tire had approximately 50 per cent of the original tread depth at the crown. Tests were also run on the two different types of cording at varying temperatures, with the reported result that Tyrex retained more of its original strength than nylon at temperatures of 100°, 220°, and 300° F.

Fort Wayne Hears Deskin on Viton

► Robert C. Deskin (DuPont), spoke on the subject "Recent Developments in Viton Technology" at the second meeting of the 1960-1961 season of the Fort Wayne Rubber & Plastics Group, held on December 1, 1960, at the Van Orman Hotel in Fort Wayne, Ind. The technical meeting was attended by 216 members who heard Mr. Deskin discuss the advantages of Viton A, A-HV, B, LD-227, and LD-242. The speaker explained that LD-227 is a new development in fluoroelastomers, a fluid, low molecular weight Viton. He stated that it improves processing of Viton without the excessive loss of physical properties, before and after aging, encountered with conventional plasticizers.

Temperature Factors

Mr. Deskin pointed out that Viton B vulcanizates are more heat resistant than Viton A vulcanizates, and they age differently. He explained that Viton A vulcanizates of less than 60 Shore A hardness are very difficult to obtain due to the inherent toughness of the polymer. However, the hardness of Viton at elevated temperatures does not remain constant but decreases with increasing temperature, he remarked, therefore, a 60 hard Viton compound is the same hardness at 400°F. as a 45 hard silicone compound.

He also discussed the effect of different compounding ingredients on the transfer molding of Viton, and presented factors affecting the compression set of Viton.

Stauffer-Hewitt Officers

► Stauffer-Hewitt, Inc., a new firm formed recently by Stauffer Chemical Co. and Hewitt-Robins, Inc., to produce polyurethane foams, has elected its officers and directors. The newly-elected officers are: A. E. Albright, president and board chairman; P. B. Harris, vice-president and general manager; L. W. Schnuelle, assistant general manager; T. G. Everett, treasurer; I. C. MacDougall, secretary; J. F. Roberts, comptroller and assistant secretary; and R. N. Stillman, assistant treasurer. Members of the board of directors are: A. E. Albright, S. S. Emison, J. W. Kettle, C. L. Arnold, C. W. Mottinger, and E. B. Gardner.

R. W. St.Onge

Named By Scott Testers

► Richard W. St.Onge has been appointed technical sales and service representative for Scott Testers, Inc., Providence, R. I. Mr. St.Onge will handle the firm's line of physical testing equipment for rubber, textile, paper, wire, plastic, leather and other basic industries in the New Jersey, Delaware, Maryland, and eastern Pennsylvania areas. A graduate of Bryant College in 1956 with a B.S. degree in business administration, Mr. St.Onge has been associated with Scott Testers for more than 10 years, starting out as errand boy and working up through the parts and service departments. After returning from military service in Korea, he became assistant parts manager and subsequently was named service manager of the Scott Testers organization during 1959.

Cabot In Argentina

► Cabot Corp., Boston, Mass., has received authorization from the Argentine Government for the immediate construction of a 30 million pound per year carbon black plant in Argentina by its subsidiary, Cabot Argentina S.A.I.C. Cabot reports that construction has begun at the plant site, purchased from Esso Argentina, in Campana near Buenos Aires. The plant, costing $4 million, is expected to be in operation by late 1961 and Cabot has posted a bond to the Argentine Government guaranteeing early completion. The complete range of Cabot oil furnace blacks will be produced at the new plant, which will be completely equipped with modern analytical, quality control, and rubber testing laboratories, officials of the Cabot organization declared.

Elastomer Group Hears About Light Measuring

► The Elastomer & Plastics Group, Northeastern Section, ACS, heard a talk on "Molecular Motions in Elastomers and Plastics as Revealed by Photo-Elastic Measurement," by Dr. Rodney D. Andrews (M.I.T.), at its meeting on November 15, 1960, at the Morse Auditorium in Boston, Mass. According to Dr. Andrews, stress patterns in rubber and plastics can be studied with the use of birefringence. He explained that birefringence is a directional variation measurement in the refractive index and the ratio of stress to birefringence varies with the nature of the material being studied.

The speaker explained the method of making the stress measurements and pointed out that the data obtained were interpreted in terms of molecular group movements within the transparent samples. He stated that by this method one could calculate the length of the statistical chain segment of polymers and measure the monomer sequence in the copolymer chain. Dr. Andrews told the group that polymer structures could be constructed by analyzing the patterns of birefringence.

Named by Union Carbide

► J. C. Malone has been appointed assistant to the general manager of the Silicones Division of Union Carbide Corp., New York, N. Y. He comes to his new post from the Union Carbide Chemicals Co. plant at Institute, West Va., where he was assistant superintendent, and he will be located in New York, working on special assignments for the general manager involving all aspects of the silicones field.

In addition, C. T. Schieman, Jr. has been appointed general sales manager for the division, and P. S. Manchester, assistant general sales manager. R. S. Wishart has been appointed manager of product marketing, reporting to the general manager. Other appointments include that of Dr. T. F. Hart as product manager of fluids, and J. H. Lorenz, product manager of resins and water repellents. Also announced were changes in the field sales group: T. J. Fontelieu, Jr. has been named Eastern region manager; F. S. Phinney, Southern region manager; and C. F. Tripp, region product manager, Eastern region.

Bellanca Suing Albert For $26 Million

► Sydney L. Albert was recently named principal defendant in a $26,242,840 damage suit filed in Cleveland, Ohio, Federal Court by his former company, Bellanca Corp. He is being charged with misrepresentations before and after he gained control of the used rubber machinery firm in early 1955. Named defendants with Mr. Albert were 13 others, including his wife, brother and sister, and 10 former company directors.

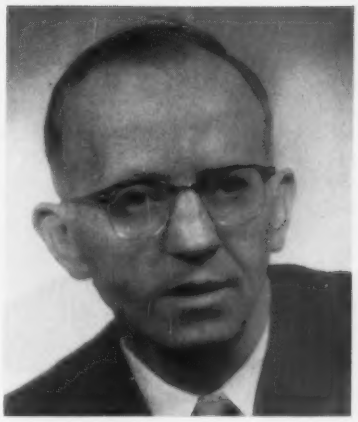
Earlier, the Ohio Supreme Court sided with Mr. Albert's former partner, Edward Harris, when it refused to review, and thus affirm, decisions validating $157,000 in loans made between the two companies the two men owned. Mr. Harris' Goodride Tire Co. sued the defunct Albert-Harris, Inc., for the money, producing cognovit notes as evidence of the debt.

The latest suit was brought under the Securities and Exchange Commission Act of 1934, which also is the law involved in the criminal action.

Mr. Albert traded his used rubber machinery business to Bellanca in February, 1955, in a move that gave him control of the combined operation. Bellanca's version of what happened at that time is presented in the petition, which adds: Mr. Albert told the company, then known as Bellanca Aircraft Corp., that he owned all the assets of L. Albert & Son. He valued the assets at $7,450,000 and offered the firm to Bellanca in return for an 80 per cent interest in the enlarged company. Bellanca issued the Albert firm 1,071,250 shares of stock out of a total capitalization of 1,300,000 shares. The market value of the shares then given L. Albert was estimated at $16,604,375. The allegations made by Albert at that time "were untrue, false and misleading in every respect, including the representations concerning the value of the assets so transferred," the petition says.

"Bellanca failed to realize any net income and sustained several losses in connection with the sale of the L. Albert & Son machinery." Under Albert's control, the suit charges, $1 million of Bellanca's money was spent in transactions involving manipulations of Bellanca stock on the American Stock Exchange. Bellanca stock rose from $13.65 a share in February, 1955, to $30 a share in the Summer of that year, then dropped to $1.75 a share in December, 1956.

Five of the 44 counts in the 45-count indictment also charge Mr. Albert with perjuring himself before the Securities and Exchange Commission. The trial originally was scheduled for June, 1960, three months after Mr. Albert was indicted by the Federal grand jury. It has been postponed three times, the last time in November, 1960, at the request of Government attorneys.



R. C. Woerner

Petro-Tex Vice-President

► Rudolph C. Woerner has been elected vice-president of manufacturing for Petro-Tex Chemical Corp., Houston, Texas. Mr. Woerner had been associated with Sinclair Refining Co., joining the firm in 1938 as a research chemical engineer. In 1942 he was active in the Government's synthetic rubber program, designing appropriate operating units to manufacture butadiene. In 1943 he joined Sinclair Rubber, Inc., which operated a butadiene plant near Houston, Texas, as manager of technical research and development services.

When Sinclair Oil Corp. established a new subsidiary, Sinclair Research Laboratories, Inc., at Harvey, Ill., Mr. Woerner joined the subsidiary as research supervisor, a post he held until 1950 when he transferred to Sinclair Rubber, Inc., in Houston as assistant to the operations head, and became general superintendent in 1953. Mr. Woerner was named director of engineering in 1955, when the butadiene plant was purchased by Petro-Tex, and became plant manager in 1959.

Rhode Island Club Hears Winkelmann

► Dr. H. A. Winkelmann (Dryden Rubber) presented a talk on "Ozone Laboratory Tests Versus Out-of-Door Exposure Tests" before the Rhode Island Rubber Club on November 3, 1960, at the Pawtucket Country Club, Pawtucket, R. I. The club elected its 1961 officers and directors at the meeting. The new officers are: *Chairman*, Walter J. Blecharczyk (Davol Rubber); *Vice-Chairman*, Edwin C. Uhlig (U. S. Rubber); *Secretary-Treasurer*, Joseph Vitale (Crescent Wire); *Directors*, C. A. Damicone (Acushnet Process), Joseph M. Donahue (Goodyear-Chemical), Paul Hastings (Kleistone Rubber), Vincent Casey (J. M. Huber), Tom Crosby (H. Muehlstein).

In his talk, Dr. Winkelmann, Goodyear Medalist for 1961, explained that results of tests made showed that there are differences between ozone laboratory aging and aging out-of-doors in extremely cold weather or in strong sunlight. He also pointed out that differences were shown between dynamic and static aging.

Dr. Winkelmann emphasized that there can be no valid correlation between laboratory testing and outdoor exposure without extensive cross-checking. According to the speaker, test conditions must be the same as those in ultimate service. He cautioned that antiozonants and waxes should be used on the basis of test results, not on the technical data furnished by suppliers.

Mold Release Agent

► Rulon Spray, described as an easy to apply reinforced fluorocarbon anti-stick and mold release agent, has been introduced by Dixon Corporation, Bristol, R. I. The spray is said to provide a low friction, clean, dry surface which ends mold sticking problems and speeds mold release, even at low temperatures and without curing. It is reportedly fast-acting, and dries instantly, without leaving a gummy or oily film, and is said to last for several cycles, in addition to being chemically inert, insoluble and thermally stable to over 500° F. The manufacturer recommends it for all molding applications for plastics, rubber, synthetic rubbers, and high polymers, and in cases where painting, plating, or hot stamping follows molding operations.

Heads Firestone Research

► Ernest R. Handley has been appointed managing director of research for Firestone Tire & Rubber Co., Akron, Ohio. He previously has been executive vice-president of the Plastic and Synthetic Fibers Divisions of Firestone at Pottstown, Penna. Mr. Handley graduated from Ohio State University in 1923 with a B.S. degree in chemical engineering and was associated with Republic Steel Corp. before joining Firestone in 1928 in its Rubber Compounding Division.

He was manager of Firestone plants in Buenos Aires, Argentina and Pratteln, Switzerland, in the 1930's. During World War II, he was in charge of the firm's synthetic rubber operations, including the plants which Firestone operated for the Government at Akron, Ohio, Port Neches, Texas, and Lake Charles, La. Following World War II he became production manager for all of the company's foreign plants, although he served briefly as manager of Firestone's new tire plant in Des Moines, Iowa, in 1945.

E. R. Handley

Mr. Handley had been associated with the Firestone Plastics Co. since 1948, when he was named manager of the Pottstown facility. He was named vice-president of the Plastics Division in 1952, retaining his duties as plant manager. In 1956 he became executive vice-president of the Plastics Division and was appointed to the same position in the Firestone Synthetic Fibers Co. when the subsidiary was formed in 1960.

Ontario Hears Pfisterer

► "Modern Nitrile Rubber Technology" was the subject of a paper delivered by H. A. Pfisterer (Polymer Corp.) at a joint meeting of the Ontario Rubber Group and the Wellington-Waterloo Section of the Chemical Institute of Canada, held on November 8, 1960, at the Kress Hotel in Preston, Ontario, Canada. I. Harris (Polymer Corp.) was co-author of the paper. Mr. Pfisterer discussed the basic properties controlling the behavior of nitrile rubber. He explained that polymer-to-polymer incompatibility and the consequent processing of one polymer component as a micro-dispersed phase is shown to improve processability, and, in some cases, the vulcanizate properties.

Mr. Pfisterer pointed out that examples of this phenomenon are drawn from the application of rubbers as plasticizers for thermoplastic resins and the use of a cross-linked nitrile rubber as a processing aid. He also discussed compounding principles that provide improved heat and ozone resistance.

On December 6, 1960, the Ontario Rubber Group held a meeting at Prudhomme's Motel, Vineland, Ontario, Canada. James G. Thompson (Supertest Petroleum) was the featured speaker, and he presented an illustrated talk on the 1960 Harmsworth Trophy defense.

Plastics Production Up

► A five to ten per cent increase in production of plastics materials for 1961 is forecast by the Society of the Plastics Industry. The SPI expects that 1961 production of plastics materials will be between 6,465,000,000 and 6,773,000,000 pounds. The society's estimate for 1960 plastics production is 6,158,000,000 pounds compared with actual production of 5,864,887,000 pounds in 1959 and 4,518,000,000 pounds in 1958.

Last year, for the first time, polystyrene passed the billion pound mark to join polyethylene and the vinyls which reached this high mark in 1959. The production of polystyrene for 1960 increased approximately 5 per cent while polyethylene and the vinyls were up 12 and 4 per cent, respectively. The other major plastic materials showing an increase was polyester, which was up 8 per cent.

Considering the various areas of the plastics industry, the SPI figures indicate that while thermoplastic molding, identified mainly with consumer items, increased in the area of 15 per cent, thermosetting molding, in the main industrial items, declined nearly 10 per cent.

CPR International Formed

► CPR International Corp. has been formed at 555 North Alaska Ave., Torrance, Calif., to engage in the production of a full line of polyurethane and polyurethane foam materials. The new firm has constructed a 30,000 square foot building, now in operation. A capacity of 500,000 pounds per day of urethane polyester base is being made available to consumers. CPR International is producing flexible urethane foam stock up to 80 inches wide and 24 to 32 inches thick in any specified length or density. Rigid and solid urethanes are also in production. This activity will be supplemented by manufacture of urethane chemicals. The company is also engaged in extensive research and development activities within its field both for government agencies and industry. Thomas Patrick Dougan has been named president of CPR International, while Harry Gerstin serves as vice-president in charge of sales. Sam Chess holds the post of vice-president in charge of research and Harold Gartner is vice-president in charge of production. All four executives were formerly associated with American Latex Products Corp.

New RCA Latex Grades

► Three new grades of hot type SBR synthetic latex are now being manufactured by Rubber Corporation of America, Hicksville, N. Y. Designated IRS 2000, 2001, and 2002, these recently developed synthetic latices are said to represent a new manufacturing program for RCA. The company reports that the latices are also being tailor-made to meet specific industrial requirements and are available in different concentrations. RCA expects these latices to find use in the manufacture of adhesives as well as other products.

Lehigh Adds New Line

► Lehigh Chemical Co., Chestertown, Md., has entered into the manufacture of plasticizers. The company has formed a Plasticizer Division and appointed Joseph P. Clancy as its manager. Mr. Clancy previously had been a district sales manager for Emery Industries, Inc.

NCRG 1961 Officers

► The Northern California Rubber Group installed its 1961 officers and directors on December 3, 1960, during its Annual Christmas Party at the Orinda Country Club, Orinda, Calif. The newly-elected officers are: *President,* Virgil Price (Burke Rubber); *Vice-President,* Vic Carriere (Mansfield Tire & Rubber); *Secretary,* Roger Thacher (Union Rubber); *Treasurer,* Gene Unterzuber (Oliver Tire & Rubber); *Directors,* Bob Stewart (Dow Corning), Henry Krakowski (Oliver Tire & Rubber), Gene Gador (B. E. Dougherty Co.).

On November 10, 1960, the Northern California Rubber Group held a meeting at the Elk's Club in Berkeley, Calif. Joseph D. Coons, director of enforcement, Bay Area Air Pollution Control District, addressed the group on the subject "Smog Control." Mr. Coons stated that smog not only affects personal comfort, but also contains ingredients which accelerate the degradation of rubber products. He discussed what the district is doing about controlling smog.

Raybestos Makes 19-Ton Belt

► In the past several months the heaviest conveyor belt ever made at the Manhattan Rubber Division plant of Raybestos-Manhattan, Inc., Passaic, N. J., was moved from a floor-level platform to a lo-bed truck by means of cabled power from another truck. The belt, made for a large ore mining operation in South America, is 63 inches wide and weighs 19 tons. The company reports that longer belts and larger diameter rolls of belt have been made by Manhattan Rubber, but the record weight of this conveyor belt is due to its great width, over 5 feet wide. Relatively few belts this wide have been made, but the trend is to wider belts for higher capacity to increase production and reduce costs, the company states.

According to the firm, Manhattan Rubber is one of the few manufacturers that can make belts as wide as this one, mainly due to press facilities. The belt was vulcanized in one of the largest precision belt vulcanizers made, with temperature controls that keep within two degrees at any point over platen areas about equal to a bowling lane.

Raybestos-Manhattan reports that engineering and design are becoming increasingly important in conveyor belt manufacture due to synthetic super-strength fibers and synthetic rubbers developed in the past few years. To evaluate these materials and to provide better belts, Manhattan Rubber also has designed the world's largest belt dynamometer that puts full-size conveyor belts through greatly aggravated production stresses.

Monsanto Ethylene Plant

► An ethylene plant with a capacity in excess of 500 million pounds a year will be built by Monsanto Chemical Co. at Chocolate Bayou, Texas. According to the company, the facility, to cost between $50 million and $100 million, would be the biggest in the world for making ethylene, a key intermediate in the production of synthetic rubber and plastics. The plant is scheduled for completion in 1962 and, in addition to ethylene, also will produce 42 million gallons of benzene and 50 million pounds of naphthalene a year, as well as propylene, cumene, phenol, acetone, ethyl benzene, and other hydrocarbons used as raw materials by the company.

Salesmen Elect Officers

► New officers of the Rubber Chemical Salesmen's Association of Akron were installed on December 30, 1960, at a luncheon meeting in Akron, Ohio. The newly-elected officers are: *President,* Warwick McCutcheon (J. M. Huber); *Vice-President,* William Bowers (Midwest Rubber Reclaiming); *Secretary,* Gil Gingold (Sid Richardson Carbon); *Treasurer,* M. E. Noah (C. P. Hall).

Two Join Akron Staff

► Drs. John H. Bachman and Alan N. Gent have jointed the faculty of the University of Akron, Akron, Ohio. Dr. Bachman, who had been manager of applied inorganic research for Columbia-Southern Chemical Corp., joins the staff as a professor of chemistry, while Dr. Gent, formerly a research physicist for the British Rubber Producers' Research Association, will serve as a professor of polymer physics and research associate in the Institute of Rubber Research.

Dr. Bachman graduated from the University of Minnesota in 1931 and received his Ph.D. in physical chemistry from that institution in 1939. Prior to joining Columbia-Southern in 1942, he was with Goodrich as a research chemist. Technical articles by Dr. Bachman have appeared in such magazines as RUBBER AGE, *Physical Review,* and *Rubber Chemistry and Technology.*

Dr. Gent was educated at London University where he received his B.S. degree (General) in physics and mathematics and a B.S. degree (Special) in physics in 1949. He earned his doctorate from London University in 1955. Since 1949, Dr. Gent had been associated with the British Rubber Producers' Research Association.

Deist Heads Laboratory

► H. H. Deist has been named manager of the engineering laboratory of Firestone Tire & Rubber Co., Akron, Ohio, succeeding George P. Bosomworth who has retired after 35 years with the company. A. M. Lancaster, previously senior staff engineer, succeeds Mr. Deist as assistant manager of the laboratory.

In his new post, Mr. Deist will direct process and equipment development for all Firestone plants. He joined Firestone in 1940 as a design-engineer, was named project engineer in 1945 and became design supervisor in 1949. He was with Firestone's Guided Missile Division in California for a year before returning to Akron in 1955 as assistant manager of the engineering laboratory.

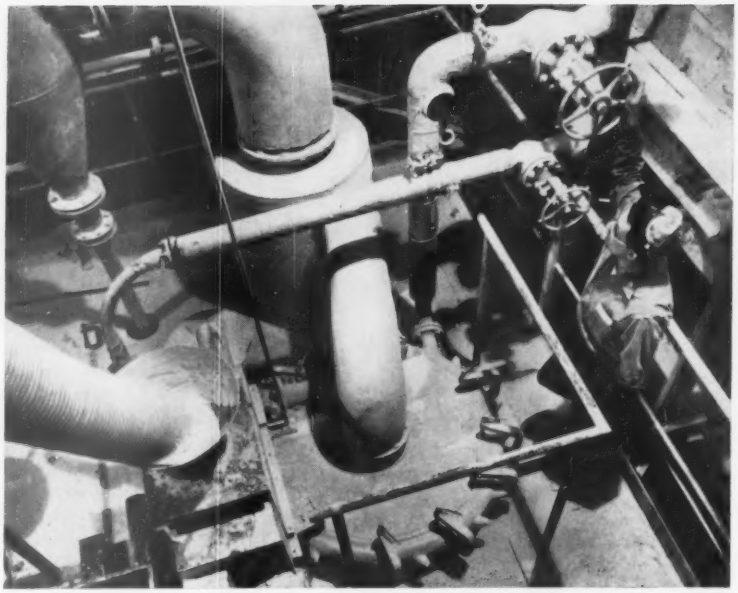
Mr. Lancaster started with Firestone in 1939 as an apprentice machinist. He served in the U.S. Navy during World War II after graduating from the University of Akron. In 1951 he was named project engineer and in 1957 was appointed senior staff engineer.

Mr. Bosomworth had been head of the engineering laboratory for 25 years and has been responsible for 40 patents in the fields of electronics and rubber processing equipment.

N.J. Zinc Using Largest Micronizers

► Two micronizers — three and a half feet in diameter—said to be the largest micronizers in the world, are shattering titanium dioxide pigments to fractional micron sizes around the clock at the New Jersey Zinc Co., Gloucester City, N. J., TiO_2 pigment plant. Two giant energy mills, plus two other large micronizers—one being three feet in diameter and the other two and a half feet—are fine-grading titanium dioxide pigments to as small as a quarter micron — 1/200th the diameter of human hair.

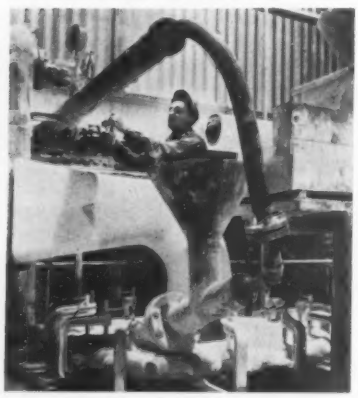
Approximately 55 per cent of the total dioxide pigment production serves the paint industry, and 45 per cent is sold to the rubber, paper, plastics, floor coverings and other industries.



Looking down at the world's largest micronizer fluid energy grinding mill at the Gloucester City, N. J., titanium dioxide pigment plant of New Jersey Zinc Co. Dried titanium dioxide particles are interimpacted in the grinding chamber seen in center of photograph. The tangential jets are visible between the clamps.

Particle Uniformity

While the size of the particle is highly important in pigment manufacture, uniformity of particle size is even more important. With the micronizer, particle uniformity is achieved simply by adjusting feed rate and/or rate of grinding fluid (superheated steam is used by New Jersey Zinc). These factors control rate and violence of interimpaction and, ultimately, particle size.



The feed venturi, where titanium dioxide particles enter the micronizer for interimpaction.

The first jet mill at Gloucester City, engineered and fabricated by Sturtevant Mill Co., Dorchester, Mass., was installed about five years ago and had a 30-inch diameter. Later, New Jersey Zinc officials collaborated with Sturtevant engineers in installing three-foot diameter malls. The 36-inch unit at that time was the largest micronizer in existence. The first 42-inch mill was installed in 1959 and enabled the company to produce almost as much high quality pigment as two 30-inch mills. The second 42-inch unit was installed in early 1960.

Prior to the fine grinding step by the micronizers, the TiO_2 undergoes extensive processing. The ore is first dried, ground and digested in sulfuric acid. Then, after clarification and evaporation, the material is precipitated, filtered, bleached and refiltered. It is then de-watered, calcined and cooled. At this point, some grades are dry milled and packed immediately. Some undergo further classification, treatment, filtering, dewatering and drying. The jet milled grades undergo micronizing at this point.

Titanium Dioxide Added

The titanium dioxide is introduced into the grinding chamber through an opening near the periphery. Tangential jets of superheated steam cause the violent interimpaction of the particles and centrifugal force created by the highspeed jets keeps oversize particles in the grinding zone until they are sufficiently reduced to move inward to the central point of discharge. The feed rate and quantity of the grinding fluid determines milling energy and production capacity. The 42-inch unit, depending upon material ground and fineness desired, can process up to three tons per hour.

The micronizer is most frequently used in the grinding of titanium dioxide and other natural and synthetic pigments, resins, pharmaceuticals and pesticides. The mill is also used for the grinding of aluminum compounds, calcium compounds, carbonates, carbon black, copper compounds, filler materials, heat-sensitive materials, magnesium compounds, mica waxes and fatty acids, zinc compounds, and zircon silicate.

Correction

► It has been called to our attention that several errors appeared in the article "Determination of Latex Particle Size Distributions by Fractional Creaming with Sodium Alginate," published in the December, 1960, issue of RUBBER AGE. On page 487, line 13, the reference to Figure 3 should be changed to Figure 4. Again on page 487, the caption for Figure 2 should read: "Fractional creaming of calibration latices." On page 488, paragraph 6, the equation $D = 223 + 117.7$ (l/c) should read $D = 223 + 111.7$ (l/c.). We regret the errors.

British Cable Symposium

► The Institution of the Rubber Industry will hold a joint conference on Rubber and Plastics in Cables on March 1, 1961, at the Institution of Electrical Engineers, Savoy Place, London, England. Ten papers are scheduled to be presented during the one-day meeting. They are:

"Problems of Electricity Transmission" by Sir Christopher Hinton (Central Electricity Generating Board); "The Electrical Properties of Polymeric Insulating Materials in Power Cables" by N. Parkman (Electrical Research Association); "Use and Performance of Trailing Cables in Mining" by W. C. Symes (National Coal Board); "Stabilization of Plastics Insulating Materials for Wire and Cable" by W. L. Hawkins and F. H. Window (Bell Laboratories, U.S.A.); "Telecommunications, with Particular Reference to Cables and Their Requirements" by R. J. Halsey (Post Office Engineering Department).

"The Application of Fluoroelastomers in the Cable Industry" by K. H. Whitlock (DuPont Co., Ltd.); "Nitrile Rubber and Vinyl Polymer Mixtures" by C. Y. Almond (Imperial Chemical Industries); "The Basis and Practice of Compounding Butyl Rubber for Cable Insulation" by A. G. Strong (Esso Petroleum Co., Ltd.); "Irradiation of Polymeric Materials" by R. M. Black (British Insulated Callender's Cables, Ltd.); and "Recent Developments in the Use of Neoprene for Wire and Cable" by K. H. Whitlock (Dupont Co., Ltd.).

Mold-Formed Tire

► A colored translucent tire manufactured by pouring the ingredients into a mold has been developed by the Goodyear Tire and Rubber Co., Akron, Ohio. Although experimental models have been road-tested at 65 mph, it may be several years before the new tires reach the market, according to the company. Capable of being lighted from within, the tire has no fabric, splices or layers in its construction. The tubeless experimental tires are made of specially compounded Neothane, a polyurethane rubber, which can be poured because of its low molecular weight. The material is noted for its resistance to puncture, cutting and abrasion and for its high load-bearing capacity, combined with good resilience.

L. H. Johnstone

New Phillips Manager

► Phillips Chemical Co., Bartlesville, Okla., has named L. H. Johnstone to the new post of manager of sales development for its Rubber Chemicals Division. A graduate of the University of Kansas with a B.S. degree in petroleum engineering, Mr. Johnstone joined Phillips in 1940. He has served in various capacities at Phillips Texas Gulf Coast and West Texas manufacturing facilities, and since 1957 has been manager of Adams Terminal, Phillips chemical complex on the Houston, Texas, ship channel.

Tylac Custom Service

► The newly-expanded Tylac plant of the Chemical Division of International Latex Corp., located at Cheswold, Del., will be devoted to custom service. Three new 3,000 gallon reactors have been added doubling the plant's capacity to 17 million pounds per year, and five more reactors are planned. Eventual plant capacity is estimated at 36 million pounds of dry polymer output per year. According to Fred Andrews, executive vice-president, "The ILC Chemical Division technique offers complete latex development service. It starts with the customer's need and ends with volume production, with steps along the way consisting of laboratory research, evaluation, physical testing and pilot plant runs." The division will develop a modified material or a completely new formula if there is no standard Tylac latex to meet a particular customer's requirements fully.

Monochem Site Selected

► U. S. Rubber Co., New York, N. Y., and Borden Co., New York, N. Y., have selected a site in Geismar, La., for the construction of a $50 million complex of chemical plants which will convert hydrocarbons into more than a dozen chemical products. It is on this site that the jointly-owned company, Monochem, Inc., will erect a major chemical manufacturing unit using hydrocarbons as a starting point for the production of acetylene and vinyl chloride monomer. U. S. Rubber and Borden plan to erect adjacent individually owned plants which will use the output of the Monochem plant for the manufacture of other chemical products.

On completion, Monochem is expected to be an economical source of basic chemical components for the present product line of both firms, and from the long range viewpoint, the combined venture is expected to provide a base for independent expansion into new fields by each company. According to the companies, Monochem initially is to have the capacity to produce more than 80 million pounds of acetylene and approximately 150 million pounds of vinyl chloride monomer yearly. The major initial use of this output would be in the manufacture of vinyl plastic resins which Borden manufactures in Leominster, Mass., and U. S. Rubber makes in Painesville, Ohio.

Specifications Published

► Two booklets, "Guide to the Drafting of Specifications for Rubber Products," and "F.S.A.C. Questionnaires as a Basis for Rubber Product Standards," have been published by the Federation of British Rubber and Allied Manufacturers. Copies are free and may be obtained from The Secretary, 43 Bedford Square, London, England. The Guide gives advice on the kinds of test most useful for performance testing, by the user, and quality control testing, by the manufacturer, and on the dimensional tolerances appropriate to different kinds of rubber components. The questionnaires accompanying the guide indicate in detail — for each different category of rubber product—the information on function, properties, and service conditions which will be needed for the drafting of an effective specification.

1960—REVIEW AND PREVIEW—1961

► Limitations of space prevented our inclusion of the following two statements from our annual "Review and Preview" of the rubber industry published in the January, 1961 issue of RUBBER AGE. It is suggested that readers add this page to the January issue so that the report will be complete.

There should be a greater demand for scrap rubber and plastics, although there seems little likelihood that we shall see a substantial improvement in prices during the coming year.

Ben Gordon

In the first quarter of 1960, conditions seemed to warrant the promise of an accelerated demand for scrap rubber and plastics, but, unfortunately, it did not materialize. Rather, the market became more tight as releases were increasingly curtailed by the reclaiming mills due largely to cutbacks in their inventories.

For instance, the items of mixed tires was less and less in demand as manufacturers continued to send their scrap—which is generated through their various outlets—directly to their reclaiming divisions, eliminating the sale of such accumulations to the area dealers, as was the practice at one time.

Butyl inner tubes led the market at one period, and the demand for this material resulted in a price increase. However, during recent months prices have tended downward, so that the outlook now is for a much more stable market in 1961.

The export market for scrap rubber showed no appreciable improvement during 1960. Tire tread buffings and No. 1 peels were the exception, as considerable quantities of these grades did move to the overseas markets. In certain areas, however, such shipments will be greatly curtailed for six months or so due to closing of the seaway, but along the Eastern seaboard shipment for export should continue.

The outlook for scrap plastics is somewhat confusing at the present time, and difficult to gauge because of many factors. For instance, the demand for certain grades, i.e., camelback polyethylene and banana bag scrap, is almost nil. Shipments of other grades of this type scrap which originate with the dealers are oftentimes difficult to handle practicably because of the contamination content. It is next to impossible to do so profitably in view of the sorting they entail and hence most must be rejected outright.

The probability of any increase in the price of this grade of scrap seems less and less, for two reasons: (1) The volume in manufacture of the virgin material proceeds at a rapid pace, and (2) The recent cut in price applying to the virgin production.

For the first quarter of 1961, it seems the general belief is that the outlook for business is not too rosy, but there are hopeful signs of an upturn in the early spring. As the business condition improves, of course, there should be a greater demand for scrap rubber and plastics, although there seems little likelihood that we shall see a substantial improvement in prices during the coming year.

Ben Gordon

President, Scrap Rubber & Plastics Institute, NAWMD; Sales Representative, A. Schulman, Inc., Akron, Ohio

Plastics unquestionably are enjoying their greatest acceptance. We expect the surge to continue in 1961 without a hitch.

H. M. Zimmerman

The American plastics industry, prospering this year despite the general economic slowdown, will continue to thrive at a record pace in 1961 regardless of how far into the new calendar the current business lull extends. This recession the country is slumping through won't be noticed when the plastics industry closes its books on 1960. We're having a big year. And in 1961, whether a recovery occurs in the spring or it takes until summer, the momentum of our industry should produce at least a 10 per cent gain in volume over this year.

I am even more optimistic about the future of my own plant, a large-volume producer of tailor-made plastic sheeting for fabrication into end uses. We look for a 30 per cent increase in business in 1961. The Seiberling division, founded just six years ago as a manufacturer of polyvinyl chloride, has a product line today which includes more than a dozen categories of plastic. The plant, located in the central Ohio community of Newcomerstown, has been outgrown although it was doubled in size in mid-1959.

Plastics are leading today's product revolution. They're invading markets never before thought possible, simply because of their phenomenal behavior. Each year they are showing more versatility, greater economies, in their battle with metals, woods, fabrics and glass. With new production techniques and material refinements cropping up regularly the performance and styling capabilities are unlimited. And for each new development, industry and the consumer stand ready to gulp it up.

There may be concern by some industries about prospects for the immediate future, but in plastics everything's coming up roses. Nothing short of a major depression will stop this wholesale market penetration. Total production of synthetic plastic and resin material next year "will almost double" the 3.7 billion pounds marked up in 1955, the year Seiberling entered the plastics field. Production for 1960 will be at 6.4 billion pounds, according to estimates of the Society of the Plastics Industry in New York City.

Biggest plastics customer—the auto industry—is consuming its largest volume ever. There are more than 300 plastic components in the 1961 cars. What's more important, there are 22 pounds of plastic in the new car, replacing 150 pounds of metal.

It's inroads like these that spark my enthusiasm. We're not only getting our foot in the door, we're becoming entrenched. Next year you'll see the transportation industry swing to heavy plastics fabrication of trucks, trailers and buses . . . you'll see the food industry lean heavily on packages of plastic . . . you'll see plastic plumbing replace metal pipes in new homes.

Reflecting this rapid development, are the new million dollar plants, the chemical centers, the research labs, the giant warehouses which lately have carried the theme of plastics industry press announcements. Everywhere it's growth and expansion in our industry. The rate of capital expenditures is high to keep production capacity ahead of demand. And a lot of this has been going on in the last few months, when business pace otherwise has been going at a crawl. Plastics unquestionably are enjoying their greatest acceptance. We expect the surge to continue in 1961 without a hitch.

H. M. Zimmerman

General Manager, Plastics Division, Seiberling Rubber Co., Newcomerstown, Ohio

Gerke Retires

► The 25-Year Club of the Research Center of U.S. Rubber Co., Wayne, N. J., held a luncheon on December 29, 1960, to pay tribute to Dr. Roscoe H. Gerke who retired on December 31, 1960, after 35 years with the company. Also honored was Nassib Haddad who had been in charge of the textile engineering laboratory at the Research Center. Mr. Haddad retired after 43 years with U.S. Rubber.

Dr. Gerke, a senior research scientist at the Research Center, has made many major discoveries in rubber testing methods, high temperature carbon black processing, golf ball and battery separator production, and in other fields. He holds 15 patents and has had 28 technical articles published.

A graduate of the University of Illinois in 1918, Dr. Gerke received his Ph.D. degree in physical chemistry from the University of California in 1922. He was an instructor at Massachusetts Institute of Technology for four years before joining U.S. Rubber at its former general laboratories in Passaic, N. J., in 1926. For the past three years Dr. Gerke had been secretary of the Division of Rubber Chemistry, American Chemical Society.

Monsanto Antioxidant

► A rubber antioxidant which is said to confer a high degree of resistance to oxidation and copper degradation has been added to the line of antioxidants produced by Monsanto Chemicals Ltd., London, England. Known as Antioxidant BHT, it is low-priced and non-staining, and is specially recommended by the company for white and pale colored stocks. At the recommended levels it is non-blooming. As it is nontoxic, it can safely be used in contact with foodstuffs, and is also an efficient stabilizer for styrene-butadiene rubber, according to the company.

Schulman Is Rexall Agent

► A. Schulman, Inc., Akron, Ohio, has been named national sales agent for the complete polystyrene line of Rexall Chemical Co. According to Schulman, its six sales offices throughout the United States will assist Rexall's newly established East Coast, Midwest, and Pacific Coast regional sales organizations. The company states that Rexall will have completed a major polystyrene expansion program by mid-1961.

Goodyear Space Balloons

► Goodyear Aircraft Corp., Akron, Ohio, has developed coated fabric balloons which inflate in one-tenth of a second, for a high-altitude recovery system designed to control deceleration of re-entry vehicles. Developed for the Air Research and Development Command's Wright Air Development Division, the system, called "Ballute," is to be used to retard tumbling and to control speed of vehicles during re-entry through the heat barrier of the earth's upper atmosphere. A parachute is ejected at lower altitudes to complete the recovery. The system will be evaluated by special tests this summer.

AviSun Tells of Polymers

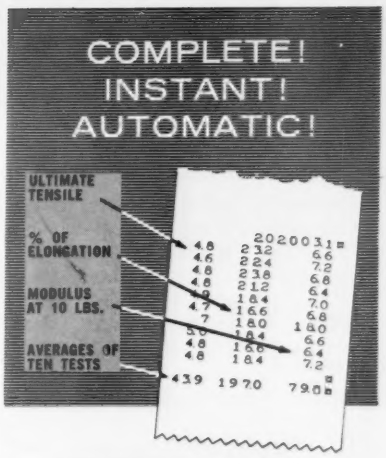
► Two new grades of sustained-heat polypropylene polymers have been announced by AviSun Corp., Philadelphia, Penna., for extrusion and injection molding. AviSun Sustained-Heat Grade 1041, designed for extrusion, is recommended by the manufacturer for use in high temperature-chemical resistant pipe and tubing applications; AviSun Sustained-Heat Grade 1044, for injection molding, is specified for many hot water-detergent appliance parts in automatic dishwashers and clothes washers, and in various automotive and electronic parts.

Sweetman 55-10

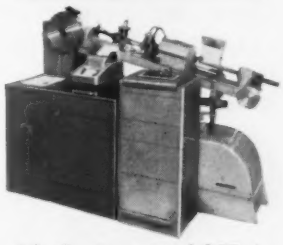
► A compounding ingredient said to eliminate the tackiness and adhesion of rubber to calender rolls has been developed by Sweetman Laboratories, Inc., Paterson, N. J. The company states that the new material, designated 55-10, also minimizes scorching due to mixing and refining temperatures, and, at the same time, does not effect qualities of self-adhesion in lamination, friction strengths, cementing adhesion, and bonding agents.

Linear Elects Moore

► Linear, Inc., Philadelphia, Penna., has elected Philip Moore as vice-president in charge of manufacturing at its Dallas, Penna., plant. Mr. Moore will direct complete plant operations including engineering, scheduling, manufacturing personnel, and labor relations in the production of the firm's line of mechanical packings and seals.



TIRE CORD TESTING *and* RECORDING



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Names in the News

Thomas A. Galvin has been named manager of the new U.S. Rubber Reclaiming Co., Inc., plant now under construction at Vicksburg, Miss.

Sidney A. Lewis, previously with Walworth Co., has joined Premier Mill Corp., New York, N. Y., as general manager.

Dr. Irwin J. Schaffner, a member of the Elastomer Research Department at the Research Center of U. S. Rubber Co., Wayne, N. J., has been promoted to senior research scientist.

W. T. L. Ten Broeck has been named natural rubber coordinator for the Research Division of Goodyear Tire & Rubber Co., Akron, Ohio. He formerly was director of research and manager of factory operations at Goodyear's Dolok Merangir rubber plantation in Sumatra.

George W. Kreil has been appointed a sales representative in the Ohio Valley Division of American Mineral Spirits Co., Chicago, Ill.

Philip R. Sayre has been promoted to technical superintendent at the Ashtabula, Ohio, chemical plant of General Tire & Rubber Co., Akron, Ohio.

Dr. Clide I. Carr has been named manager of the Synthetic Fiber Research Department at the Research Center of U. S. Rubber Co., Wayne, N. J., and **Harry S. Witt** has been appointed manager of the Plastics Research Department.

Thurman E. Brown has been appointed director of development at the Research and Development Laboratory of Columbia-Southern Chemical Corp., Corpus Christi, Texas. He succeeds **Dr. C. J. Sindlinger** who recently was named manager of the Planning Department of Columbia-Southern Chemical Corp., Pittsburgh, Penna.

Dr. Paul M. Goodloe, previously director of research and development for the Brown Co., Boston, Mass., has been named manager of the firm's newly-organized Chemical Products Division.

R. B. Park, formerly assistant sales manager, has been appointed sales manager of industrial rubber and mechanical packings at Raybestos-Manhattan, Inc., Passaic, N. J.

Robert B. Fulton, formerly manager of Anaconda Wire and Cable Co.'s plant in Orange, Calif., has been named president of the Sequoia Wire and Cable Co., New York, N. Y., a division of Anaconda.

E. C. Slaght, Jr., has been appointed vice-president and technical director of Newport Industries Division of Heyden Newport Chemical Corp.

Dawes Walter has been named manager of advertising and public relations, and **Richard S. Lee** has been named assistant advertising manager at Pennsalt Chemicals.

G. Roger McNear, who rose from tire salesman to managing director of North British Rubber Co., Ltd., a subsidiary of U. S. Rubber Co., New York, N. Y., is retiring after 27 years with the company.

Richard V. Thomas, vice-president of Goodyear International Corp., Akron, Ohio, has been named to succeed **E. E. Long** as vice-president and general manager of Goodyear International. Mr. Long is retiring for reasons of health after 44 years of service.

Vernon K. Hitch, vice-president of Akron Chemical Co., Akron, Ohio, has celebrated his 25th anniversary with the firm.

Steven Manning, director of operations for Tyrex, Inc., New York, N. Y., has resigned from the firm and plans to return to the consumer product field.

Jean Wood has joined Geigy Industrial Chemicals, Yonkers, N. Y., as a sales representative in the Texas, Louisiana, Oklahoma, Mississippi, and Arkansas areas.

S. A. Davis, president of C. P. Hall Company of Illinois, Chicago, Ill., has been elected president of the Chicago Drug & Chemical Association.

K. Henry Stroh

Appointed by Royle

► K. Henry Stroh has been named a field engineer at John Royle and Sons, Paterson, N. J., extruder builders. Mr. Stroh, who has been associated with Royle for 17 years, will make his headquarters in Paterson.

Parker Seal Names Meyer

► George Meyer, previously manager of manufacturing, has been appointed vice-president of manufacturing for Parker Seal Co., Culver City, Calif. Mr. Meyer will continue to be responsible for all of Parker Seal's manufacturing facilities in Culver City and East Los Angeles, Calif., and Berea and Lexington, Ky. He has transferred his headquarters from Culver City to Berea.

Philip E. Robinson has been elected to the board of directors of Tyrex Inc., New York, N. Y., and he has received the title of executive secretary.

Bruce M. Robertson, former manager of finance and service operation in the Apparatus Sales Division of General Electric, Schenectady, N. Y., has been named vice-president and comptroller of the Goodyear Tire and Rubber Co., Akron, Ohio.

Earl J. Cosgrave, formerly vice-president and sales manager, has been named board chairman and chief executive officer of Sheller Manufacturing Corp., Portland, Ind., and **Januarius Arthur Mullen** was elected to the board and named president of the company.

Neoprene Purge Spheres

► Colorado Interstate Gas Co., Colorado Springs, Colo., reports that it is using neoprene spheres for removing inhibiting pockets of condensed gasoline from its 40-mile gas line at the Mocani-Laverne oil fields in Oklahoma. Colorado Interstate says that its problem was that heavy hydrocarbons, cooling to ground temperatures as they move through the pipeline, condense to form liquid seals in the line sags, thus inhibiting gas flow. This situation causes back-up pressures which exceed the line maximums and cause failure of wellhead rupture discs.

The problem was solved by putting the neoprene spheres into the line via high-pressure valves. These spheres push the liquid to a point where the spheres and the liquid can be separated from the gas. The company reports that during the first six weeks of line purging with the neoprene spheres, 675,000 gallons of condensate were recovered, and the spheres last through 800 to 1,000 miles of cleaning.

Osborn Named Chairman

► Harold G. Osborn has been elected chairman of the board of Continental Carbon Co., Houston, Texas, succeeding Robert I. Wishnick, chairman of the board of Witco Chemical Co., Inc., who will continue as an active member of the Continental Carbon Co. U.S.A. board, as well as those of the subsidiaries now building plants in France and Japan. Mr. Osborn is senior vice-president of Continental Oil Co. and will continue in that capacity while serving as chairman of Continental Carbon Co. He has been associated with Continental Oil since 1921 and was manager of the Manufacturing Department for 11 years before his election as a vice-president in 1946. He was elected a director in 1954, and senior vice-president in 1956.

Quebec Hears Alfrey

► Dr. Turner E. Alfrey, Jr. (Dow Chemical) was the featured speaker at a technical meeting held by the Quebec Rubber & Plastics Group on November 16, 1960, at the Queen's Hotel in Montreal, Quebec, Canada. His subject was "Molecular Structure and Mechanical Behavior of High Polymers from a Layman's Viewpoint." He presented a general survey of polymer chemistry and covered the properties of various polymer structures.

Generally, there are three approaches by a company to the selection of a process dryer — the engineering, the economic, and the important evaluation of the intangibles. We firmly believe that SARGENT will always be found on top from every approach, for many reasons, an important one being that our machines and our people consistently deliver as promised, and more. This is the SARGENT:

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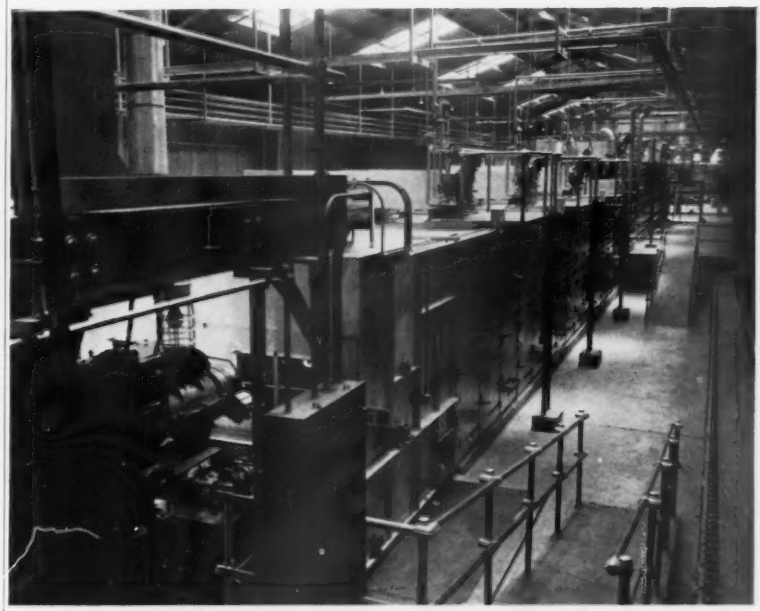

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Financial News

Belden Manufacturing

► Nine months ended September 30: Net income for the period dipped to $762,485, or 96c a share, compared to $1,402,125, or $1.78 per share, for the like period of 1959. Sales were $21,253,228, down slightly from the $22,178,125 reported for the comparable period last year.

Hooker Chemical

► Nine months ended August 31: Net income dipped to $9,285,400, equal to $1.24 per common share, as contrasted to $10,055,400, or $1.35, for the like period of 1959. Sales remained almost the same, $112,210,900, as compared to $112,-036,800 during the same period last year.

United Carbon

► Nine months ended September 30: Net income dropped to $4,004,874, or $3.15 a share, down from the $4,949,472, or $4.01, reported for the like period of 1959. Sales for the period amounted to $42,522,589, down from the $46,441,323 sales figure for the same period last year.

Mansfield Tire

► Nine months ended Sept. 30: Net income dipped to $270,971, or 19c a share, compared to $1,806,-219, or $1.27 a share, for the like period of 1959. Net sales were down slightly, to $48,958,536, contrasted with $53,632,959, for the comparable period of last year.

Goodall Rubber

► Nine months ended September 30: Net income for the period totaled $280,020, as compared to $367,917 for the same period a year ago, on sales of $11,083,971, compared to $9,989,758 sales for the like period of 1959.

National-Standard

► Year ended Sept. 30: Net income was down to $2,870,000, equal to $2.73 per share of common stock, as opposed to $3,769,194, or $3.61 per share, for last year. Sales dipped slightly, to $52,500,000 from $54,-716,277.

Triangle Conduit

► Nine months ended Sept. 30: Net income dropped over 50 per cent, down to $593,558, or 44c per share, from $1,832,621, or $1.35 per share, for the like period of 1959. Net sales declined to $39,-118,199 from $46,284,976 for the comparable period of the previous year.

Carlisle Corp.

► Nine months ended September 30: Net income amounted to $880,321, or 74c a share, compared to $996,-774, or 90c a share for the comparable period last year. Sales of $18,192,415, compared to sales of $16,946,892 for the like period of 1959.

Archer-Daniels-Midland

► Quarter ended Sept. 30: Net income for the quarter rose to $1,-130,349, up from the sales figure of $857,503 reported for the same quarter of 1959. Earnings per share were 72c on 1,569,571 shares, compared to 53c on 1,607,359 shares for the comparable period last year.

Cooper Tire

► Six months ended June 30: Net income was reported at $216,822, or 25c a share, down from the $728,-831, or 84c, for the first half of 1959. Sales were $18,477,303, slightly higher than the $18,016,014 reported for the comparable period of last year.

American Biltrite

► Nine months ended Sept. 30: Net income amounted to $1,695,-950, down from the $2,297,834 reported for the same period of 1959. Sales dipped to $51,877,629, down from $53,128,120 for the comparable period last year.

Simplex Wire

► Nine months ended Sept. 30: Net income climbed to $711,000, or $1.19 per share, compared to $575,-000, or 96c per share, for the like period last year. Sales amounted to $24,299,000, compared to $24,307,-000 for the same period of 1959.

Armstrong Tire

► Year ended Sept. 30: Consolidated net income after provision for taxes amounted to $4,960,987, equal to $2.91 per share, compared to $5,904,630, or $3.47, for the previous fiscal year. Consolidated net sales totaled $116,784,382, compared with $117,157,112 for the 1959 fiscal year. The 1959 figures were adjusted to include sales of the now wholly-owned Armstrong Tire and Rubber Co. In announcing the figures, Frederick Machlin, president, said that unit volume in tires was higher than in the previous year, but that lower prices in the competitive tire industry, combined with marketing emphasis on lower priced tires by other manufacturers, had resulted in a lower recovery on sales. He also blamed increases in material and labor costs for the decline in earnings, but noted that the cost of natural rubber recently seemed to be going lower, suggesting the possibility of a more favorable cost-price pattern for next year.

Acme-Hamilton

► Nine months ended Sept. 30: Net income for the period was $477,828, or 13c per share, and sales were $13,008,478. The company was formed in January, 1960, after the Acme-Hamilton Division was purchased by Spear & Co., so no comparable figures are available.

A. G. Spalding

► Nine months ended July 31: Earnings amounted to $901,000, equal to 96c a share, compared with $813,000, or 86c a share for the similar period of the prior year. For the three months ended July 31, net earnings were $387,000 or 41c a share.

Witco Chemical

► Nine months ended September 30: Net income for the period amounted to $2,508,200, equal to $1.66 per share, compared to $2,392,700, or $1.59 per share, for the like period of 1959. Sales rose to $74,555,500, up from the $71,673,300 reported for the same period last year.

Dow Chemical

► Year ended May 31: Net earnings after taxes amounted to $82,-404,342, or $3.01 per share, up 31 per cent from the $62,916,016, or $2.39 reported for last year.

Develops Butylride Tire

► U.S. Rubber Co., New York, N.Y., has developed a new, all-butyl rubber passenger tire called U.S. Royal Butylride. The new tire is said to give a soft and extremely quiet ride and will not squeal on turns. According to G. Raymond Cuthbertson, vice-president and general manager of the Tire Division, the new tire has greater traction than conventional tires made of styrene-butadiene rubber and will stop a car faster on a wet road than SBR tires will on a dry surface. Instead of the usual seven-row tread, the Butylride has a single heavily-inserted rib almost the full width of the tread that is said to give the tire great stability. Low profile in structure, with an oval-shaped cross-section, the tire is designed for maximum performance and safety under all driving conditions, Mr. Cuthbertson states.

Acquires N. Y. Rubber

► Acme - Hamilton Manufacturing Corp., New York, N. Y., has exercised its option to acquire all of the shares of New York Rubber Corporation. New York Rubber Corp. will be a division of Acme-Hamilton, and manufacturing operations will continue at the Swainsboro, Ga., plant, producing inflatable rubber products, sporting goods, and other products. The Swainsboro plant will be managed by Peter J. Marcello, previously vice-president of New York Rubber. Acme-Hamilton also has acquired the sales force and distributors of New York Rubber, as well as machinery for producing the rubber belting which was made at New York Rubber's plant in Beacon, N. Y.

Buffalo Elects Officers

► Officers for 1961 were elected by the Buffalo Rubber Group on December 13, 1960, during its Annual Christmas Party at the Buffalo Trap and Field Club, Buffalo, N. Y. The 1961 officers and directors are: *Chairman*, E. F. Sverdrup (U. S. Rubber Reclaiming); *Vice-Chairman*, E. R. Martin (Dunlop); *Secretary-Treasurer*, E. J. Haas (Dunlop); *Assistant Secretary-Treasurer*, R. J. O'Brien (Dunlop); *Directors*, D. Schuler (Dunlop), J. Frankfurth (U. S. Rubber Reclaiming), S. Murray (J. M. Huber), F. O'Connor (Linde), C. Peffer (Buffalo Weaving & Belting), R. Lindberg (Union Carbide).

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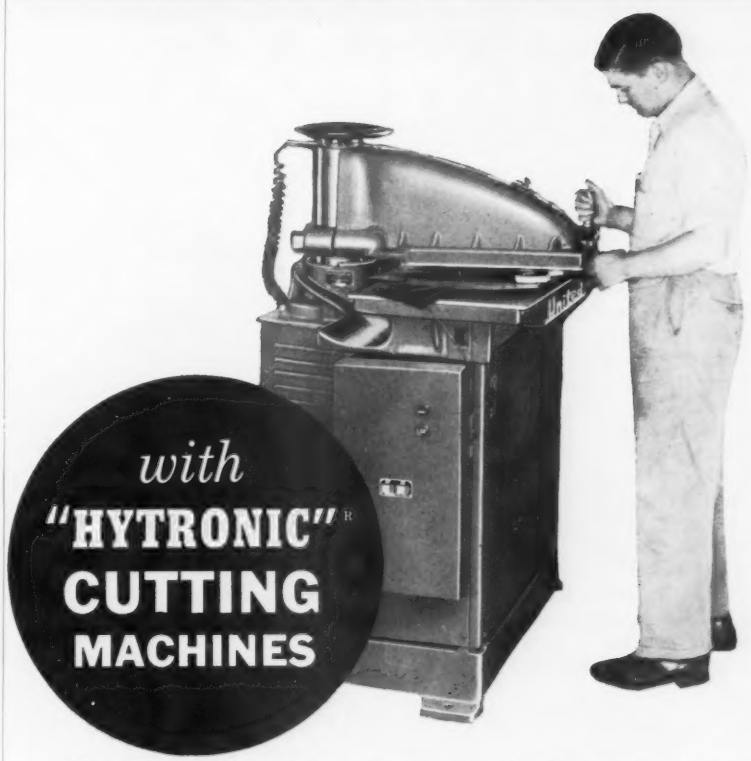

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West Coast News

► The newly-elected 1961 officers of the Los Angeles Rubber Group were introduced to the membership during Tlargi's 23rd Annual Christmas Party on December 2, 1960, held at the Cocoanut Grove in the Hotel Ambassador, Los Angeles, Calif. The 1961 officers and directors are: *Chairman*, W. M. Anderson (Gross Mfg.); *Associate Chairman*, C. W. Churchill (Naugatuck Chemical); *Vice-Chairman*, L. W. Chaffrey (Ohio Rubber); *Secretary*, C. F. Ashcroft (Cabot); *Treasurer*, J. L. Ryan (Shell Chemical); *Assistant Secretary*, W. C. Scheuermann (Plastic & Rubber Products); *Assistant Treasurer*, R. F. Dougherty (U. S. Rubber); *Historian-Librarian*, R. N. Phelan (Atlas Sponge Rubber); *Directors*, B. R. Snyder (R. T. Vanderbilt), L. E. Peterson (Goodyear), A. R. Fisher (Parker Seal), H. W. Sears (Stillman Rubber), H. J. Brandenberg (Firestone), R. L. Wells (H. M. Royal), D. Montgomery (Xylos Rubber).

► Extruded Products, Division of Stillman Rubber Co., has moved into a new 30,000 square foot plant at 750 N. Main St., Orange, Calif., doubling its former capacity. The new main building houses a research and development laboratory as well as offices and production facilities. Production compounds are mixed in a separate two-story building at the rear of the plant; raw materials are brought in at the second level and the mixed compounds are moved out at the lower level ready for extrusion. Extruded Products manufactures large solid extrusions, intricate configurations, giant O-rings and specially designed inflatable sections for industrial and commercial applications.

► West American Rubber Co. of Los Angeles, Calif., celebrated its 50th year of operation last December, making the firm one of the oldest on the Pacific Coast. According to West American, its laboratory has developed many highly specialized rubber compounds with properties designed for particular applications, such as extreme abrasion, high temperatures and resistance to difficult chemicals. The firm produces a complete line of industrial rubber products, including molded goods, lathe cut goods, rubber-to-metal assemblies, extruded goods, rolls, sheeting and special hand-built articles.

► The University of Southern California Tlargi Rubber Technology Foundation Memorial Fund has received a donation of $3,000 from the Lombard Smith Co. The contribution is to be earmarked for a new fund, to be known as Virginia Smith Memorial Scholarships. Two additional contributions of $500 each from the Parker Foundation went to the University of Southern California Tlargi Rubber Technology Foundation Memorial Fund and to the University of Southern California Tlargi Rubber Technology Foundation.

► Mansfield Tire & Rubber Co., Mansfield, Ohio, has completed the purchase of the remaining half interest of Pacific Tire & Rubber Co., Oakland, Calif. Mansfield Tire, through its wholly-owned subsidiary, Inland Rubber Co., has owned 50 per cent of the California firm since 1951.

► Thiokol Corp. has appointed Thomas D. Mahoney as technical representative on the West Coast. Mr. Mahoney replaces Guy Nolan, who has been transferred to the firm's home office in Trenton, N. J.

New Akron ACS Officers

► The Akron Section of the American Chemical Society has elected the following officers to serve in 1961: *Chairman*, Dr. Walter C. Warner (General Tire); *Chairman-Elect*, Dr. Leora E. Straka (Goodyear); *Secretary*, Dr. Richard M. Wise (General Tire); *Treasurer*, Dr. Paul Dietz (Pittsburgh Plate Glass); *Councilor*, Dr. Henry A. Pace (Goodyear); *Alternate Councilor*, Dr. William E. Bissinger (Pittsburgh Plate Glass). The executive committee of the Akron Section has named Dr. George E. P. Smith, Jr. (Firestone) as historian.

Woburn Introduces Acids

► Two fatty hydroxamic acids, oleyl- and fatty C-16 and C-18 hydroxamic acids have been made commercially available by Woburn Chemical Corp., Harrison, N. J. As chemical intermediates they have a reactive OH and NH group, as well as a long chain fatty group, and they can react with alkalis, metallic ions and acylating agents. On heating they form isocyanates which can be reacted further with alcohols and amines to form urethanes and ureas respectively. The isocyanates form carbamic acids with water. Industrially, fatty hydroxamic acids may be used as surface-active compounds, pigment dispersants, dyeing aids, detergents, disinfectants, tanning aids, anti-oxidants, corrosion inhibitors, lubricant additives, flotation reagents, water repellents, metal deactivators and chelating agents.

Join to Form Sto-Chem

► Witco Chemical Co., Inc. and the U. S. Rubber Co. have announced plans for a new chemical company, Sto-Chem Ltd., to manufacture synthetic rubber latex and to be built in the Midlands of England. Each corporation will own 50 per cent of the new company which is slated to go on stream in the fall of 1961. The capacity of the plant will be 8 million pounds per year, and more than $2.5 million will be invested in the project. A complete line of butadiene-styrene, high styrene, nitrile and acrylic types of synthetic rubber latex will be manufactured in the new plant. Douglas Roberts, who has been manager of manufacturing for Witco's United Kingdom operations, will leave that post to become managing director of the new firm.

Goodrich Buys Rayco

► B. F. Goodrich Co., Akron, Ohio, has purchased Rayco Manufacturing Co., said to be the nation's largest distributor of shock absorbers, mufflers and seat covers. Cost of the purchase was not disclosed, but Goodrich reports that the purchase involved the acquisition of all the issued shares of Rayco stock in exchange for Goodrich stock. According to Goodrich, it will operate Rayco as a wholly-owned subsidiary and market its tires through the 125 Rayco retail outlets.

Chem-Trend Products

► Poro-Coat and Mono-Coat, mold release agents for the release of flexible one-shot polyurethane foam and for the release of polyester and epoxy, have been introduced by Chem-Trend, Brighton, Mich. Poro-Coat is said to release the polyurethane foam with a completely open-celled surface. It is a fine dispersion of waxes and resins, said to be very fluid, and to lend itself to application by spraying or brushing. It does not separate on standing and is colorless and odorless. Mono-Coat is reported to be particularly effective for high-temperature curing applications, and to be suitable for room-temperature cured systems. It is a white, fluid dispersion which does not require curing or multiple application. Multiple releases can usually be obtained with one coat, according to the company.

Kenrich Merger Approved

► At a recent meeting, shareholders of Kenrich Petrochemicals, Inc., Maspeth, N. Y., approved the proposed merger with Laribee Wire & Equipment Corp., Camden, N. Y. The merger became effective on December 31, 1960, and called for Kenrich to acquire Laribee for 700,000 shares of its Class A common stock. According to Kenrich the merger provides a springboard for its programmed entry into the manufacture of wire insulating compounds. The company reports that it has authorized construction of additional plant facilities for Southwest Metal Industries, Inc., Phoenix, Ariz., a missile component parts manufacturing concern acquired by Kenrich as a subsidiary in the merger.

Chicago Christmas Party

► The Chicago Rubber Group held its Annual Christmas Party on December 16, 1960, at the Morrison Hotel in Chicago, Ill. A capacity crowd took part in the evening's activities, which consisted of cocktails, dinner and dancing, a floor show, and gifts for the ladies. Fred Klepetar (Johns-Manville) served as chairman of the Arrangements Committee, assisted by John Meyer (American Cyanamid), G. R. Huhn (Harwick Standard), Fred Bastian (Johns-Manville), O. H. McCollum (DuPont), B. G. Hutchinson (Copolymer Rubber & Chemical), I. O. Nejdl (Ideal Roller), A. L. Robinson (Harwick Standard), and R. V. Varick (Jensen Associates).

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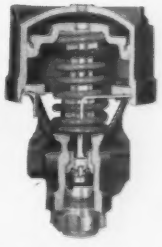

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Canadian News

► Dow Chemical of Canada, Toronto, Ontario, has announced that it will begin engineering on a plant to produce polypropylene plastic, a project which has been under study by at least three other major Canadian chemical producers. "Our raw material position, and our position in the plastics and converting markets makes polypropylene a logical product for us," a Dow official was quoted as saying. In some respects, it is understood, the proposed project will be tied into the recently completed linear polyethylene plant at the company's Sarnia works. "This plant is now operating at near capacity after encountering many costly 'start-up' problems," the Dow official continued, saying that "it is hoped that careful development work and engineering will minimize such troubles in polypropylene."

Dow has also announced that it will produce several propylene compounds at Sarnia, Ontario, and it has started engineering for production of propylene oxide, propylene glycol and polyglycol. Meanwhile, a contract for construction of the company's phenol plant on Tilbury Island, near Vancouver, B. C., has been awarded to Canadian Bechtel Ltd., and the plant is expected to go on stream by mid-1961.

Also, a contract for the first unit of the company's Fort-Saskatchewan, Alberta, works, has been awarded to Brown and Root. The unit, for production of penta- and dichloro-phenol, will go on stream early next year. Other units, including facilities for glycols and amines, are in engineering.

► Polymer Corp. (SAF) has been organized by Polymer Corp. Ltd., Sarnia, Ontario, in partnership with the Banque de Paris et des Pays-Bas, for the construction and operation of a specialty rubber facility. The new 10,000 ton plant will be built on a 175-acre site at La Wantzenau near Strasbourg, France, at an estimated cost of $12,000,000. Operation of the Strasbourg facilities will be directed by Polymer Corp. (SAF), with technical advice provided by the Sarnia company. E. R. Rowzee, president and managing director of Polymer-Sarnia has been named chairman of the board of the new French company. Other members of the board are J. P. Fontaine (Banque de Paris), R. E. Hatch (Polymer-Sarnia), F. Vernhes (Societe Francaise Polysar, Paris) and S. Wilk (Polymer-Sarnia). Mr. Hatch, who will remain as vice-president of marketing at Polymer Corp. Ltd., was named as president of the French company. S. C. Kilbank, who was area sales manager for Polymer-Sarnia, has been appointed general manager of the French company.

► National Rubber Machinery Co., Akron, Ohio, has appointed Barnett J. Danson & Associates, Ltd., as its exclusive sales representative in Canada. Danson & Associates, with headquarters at 1912 Avenue Road, Toronto 12, Ontario, will market NRM's complete line of thermoplastic extruders and accessory production equipment throughout the Dominion. NRM produces thermoplastic extruders in sizes from 1 to 15 inches, with a wide range of options featuring various heating, cooling, drive, screw and barrel combinations.

► Mansfield Rubber (Canada) Ltd. has started construction of a 30,000 square foot expansion on its plant at Barrie, Ontario. The extension is the second since the company started manufacturing tires in Barrie five years ago.

G-E Silicone Plant

► A $1 million process plant which will be devoted to the production of new types of intermediate silicone chemicals is being built by the Silicone Products Department of General Electric Co., Waterford, N. Y. The new process plant will be the company's ninth manufacturing structure and one of 17 major buildings in Waterford. The plant will be housed in a two-story structure that will add approximately 5000 square feet of manufacturing space to the 13-year-old silicone plant. According to reports, the facility, slated to go into operation in mid-1961, will be flexibly designed to carry out many reactions, including Grignard syntheses.

New Polyethylene

► Properties and specifications of its new type of high-density polyethylene, said to combine durability with processability, have been disclosed by Goodrich-Gulf Chemicals, Inc., Cleveland, Ohio. The new process and plant design for commercial production of Ameripol polyethylene were developed by Goodrich - Gulf from the Ziegler activated-catalyst system. New facilities to produce the material are under construction at the company's plant in Port Neches, Texas.

The company's process is said to impart new highs in environmental stress cracking resistance and in temperature embrittlement resistance, while maintaining the processing ease of conventional high-density polyethylene. The company reports that the durability and processability of the product, combined with other high-density properties, make the new Ameripol polyethylene exceptionally suitable for blow-molded articles, insulation for wire and cable, and extruded pipe.

Latex Unit Enlarged

► The W. Symington and Son Ltd. latex installation, at Tilbury Docks, London, England, has been enlarged because of mounting latex consumption. The unit, the only one in the south of England, is especially designed for latex, and now has a maximum storage capacity of 700,000 gallons. The storage tanks are located opposite the Port of London Authority's cargo jetty, where ocean-going ships can be berthed without having to enter the main dock system. Latex is carried by a permanent pipeline direct from ship to storage tank. Most of the latex is delivered to consumers in tanker trucks, but there are facilities for filling and warehousing latex in drums for smaller users or for re-export.

Warwick Produces Wax

► The Warwick Wax Division of Western Petrochemical Corp. has announced commercial production of a pure white, high melting microcrystalline wax, called White Mekon. Among the applications where the wax's properties can produce end-product improvements are polishes, both liquid and solid solvent types, plastics for extrusion, as well as coatings for papers and boards, according to the company.

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Obituaries

Clarence D. Howe

► Clarence Decatur Howe, a leader in Canadian politics who was also active in the formation of Polymer Corp., Sarnia, Ontario, died December 31 of a heart attack at his home in Montreal. He was 75 years old. Mr. Howe had served in Liberal Governments for 22 years. A 1907 graduate of the Massachusetts Institute of Technology, Mr. Howe went to Halifax as a professor in civil engineering at Dalhousie University and then took Canadian citizenship. He was elected to the House of Commons in 1935. Soon after the start of World War II he was given the responsibility for all war purchases and construction projects, and he was active in the formation of Polymer Corp. crown-owned synthetic rubber company. Mr. Howe is survived by his wife, two sons and three daughters.

Ellis Phreaner

► Ellis Phreaner, consulting rubber chemist, died on December 28, 1960, at Santa Ana, Calif. Mr. Phreaner was a holder of many patents in the rubber and plastics fields and for the past five years had been a full time consultant for Stoner Rubber Co., Anaheim, Calif. He also had been associated with Goodyear Tire & Rubber Co. and Bettis Rubber Co., and had done original research at the Tonawanda, N. Y., laboratories of Union Carbide Corp. Mr. Phreaner's recent activities at Stoner Rubber were on improvements in silicone-modified rubbers for use as barriers and insulation materials in the rocket and missile industries.

Robert R. Jennings

► Robert R. Jennings, a former executive of B. F. Goodrich subsidiary companies, died December 13 in Akron General Hospital after a long illness. Mr. Jennings started his career with Goodrich and was later with the Diamond Rubber Co. He served as assistant treasurer of American Anode Inc. and as a director of the Miller Rubber Co., which was absorbed by Goodrich. He is survived by his wife, a daughter and a son.

Jack L. Krauss

► Jack L. Krauss, formerly sales manager of the Aldan Rubber Co., Philadelphia, Penna., died December 30 at his home. He was 75 years old. Mr. Krauss was also a vice-president of the Schwarzwaelder Co., Philadelphia fabric technicians and specialists, while he was associated with Aldan. He retired from his position of sales manager at Aldan in 1958, but remained active as a director of the company until the time of his death. He is survived by his wife and a son.

Kenneth Crouse, Sr.

► Kenneth Curtis Crouse, Sr., a sales executive of the J. M. Huber Corp., New York, N. Y., died on January 4. He was 57 years old. Mr. Crouse was a 1927 graduate of Randolph-Macon College and joined the Industrial Products Department of the Huber Corporation in November, 1950. In recent years he was assistant divisional manager of the Rubber Division. He was director of the Connecticut Rubber Group. He is survived by his wife, a son, and two daughters.

Louis J. Woolf

► Louis J. Woolf, chairman of the board of H. Kohnstamm & Co., Inc., New York, N. Y., died on January 12. He was 70 years old. Mr. Woolf joined Kohnstamm in 1914, and was appointed sales representative in the color and flavor divisions. Thereafter, he held a number of increasingly important positions, becoming president of the company in 1950 and chairman of the board in 1957. He is survived by his wife and two daughters.

Nenien C. McPherson, Sr.

► Nenien Coatsworth McPherson, Sr., retired president of the McPherson Rubber Co., Atlanta, Ga., died December 17 in a hospital in Atlanta. He was 87 years old. Mr. McPherson was also president of Hamilton Loan Co. before his retirement several years ago. He is survived by his wife, four daughters, and two sons.

Edward Block

► Edward Block, senior vice-president and general manager of the Chemical Division of the Olin Mathieson Chemical Corp., Chicago, Ill., died January 4. He was 58 years old. A 1923 graduate of the University of Chicago, Mr. Block was an engineer for the Superior Chemical Co., Joliet, Ill., until 1930. He then joined American Cyanamid Co., New York, N. Y., serving as manager of the company's plant in Joliet, Ill. for the next three years. He was appointed secretary-treasurer of the Blockson Chemical Co., Joliet, in 1933 and remained in that post until the company's acquisition by Olin Mathieson in 1955. Mr. Block was a member of the boards of Olin Mathieson and Helene Curtis Industries, Inc. He belonged to the American Chemical Society. He is survived by his wife and a son.

Jack Sherman

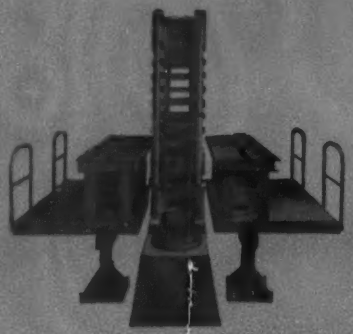
► Jack Sherman, former president of the Plicose Manufacturing Corp., New York, N. Y., died of a heart attack on October 31. He was 51 years old. He was a graduate of the College of the City of New York, and has been credited with many technical and engineering refinements in the making of plastic film, including work on the development of polyethylene sheeting for industrial use and packaging. He is survived by his wife and two daughters.

John R. Busser

► John R. Busser, general manager of the Sherman Rubber Machinery Co., Worcester, Mass., died December 1 in Worcester. He was formerly associated with the Lawrence Barry Co., Medford, Mass., and the New England Rubber Machinery Co., Boston, Mass. He is survived by his wife and two sons.

Herbert S. Fitz Gibbon

► Herbert Stewart Fitz Gibbon, president of the Pilot Packing Co., Inc., Sea Cliff, L. I., N. Y., and the New Jersey Asbestos Company, died November 4 in New York City. He was 75 years old. Mr. Fitz Gibbon was a former trustee of Sea Cliff. He is survived by his wife, a daughter, and two sons.



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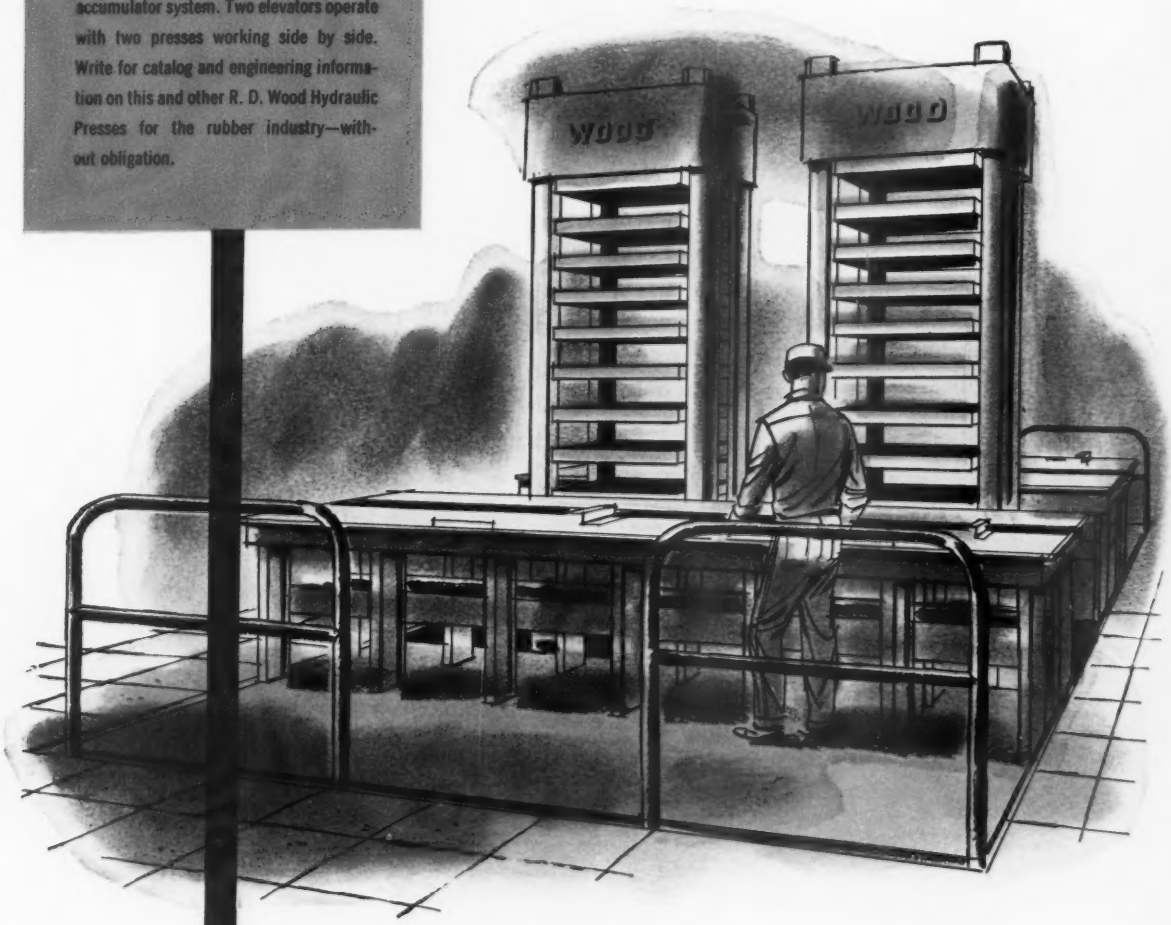

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Overseas

New Delhi—The laying of the cornerstone of Goodyear Tire and Rubber Co.'s new tire and tube plant near New Delhi, India, marked another step in the building of the $12 million facility due to be completed in 1961. The plant will produce passenger, truck and farm tires for the replacement and original equipment markets in India and the Far East.

Tokyo—Toyo Rubber Co., Ltd., will build a $2.2 million tire plant at Atsugi, near Yokohama, Japan. The plant will have a monthly production capacity of 1,000 tons of tires and tubes and will be located near a foam rubber plant which Toyo intends to place in operation.

Moscow—The Soviet external trade state agencies and the Italian State concern, ENI, have concluded an agreement whereby Italy is to buy 12 million tons of Soviet oil within the next four years in exchange for Italian steel tubing and synthetic rubber. The Italian synthetic rubber deliveries to the Soviet Union will total 50,000 tons, according to the news agency Tass.

Rome—Montecatini of Italy has filed a lawsuit against Shin Nipon Chisso, charging the Japanese firm with planning to manufacture polypropylene without a license. Montecatini claims world-wide patent rights to the plastic, which was discovered in Italy about six years ago, and contends that these rights have been recognized in Japan.

Berlin—Farbenfabriken Bayer, a West German concern, is expanding production capacity for several synthetic rubber types, including Perbunan C, which will be increased to 25,000 tons per year. Bayer also intends to start commercial production of polybutadiene and polyisoprene with newly developed stereospecific catalyst systems.

Stockholm—The Norwegian rubber company A/S Askim Gummivarufabrik of Oestfold, Sweden, will establish a subsidiary company in Gothenburg to promote sales in Scandinavia in connection with market changes. The share capital will be between 150,000 and 450,000 Swedish crowns.

Berlin—Houdry Process Corporation, Philadelphia, Penna., and Chemische Werke Huels, Marl, West Germany, will form a jointly owned company, Katalysatorenwerke Houdry-Huels G.m.b.H, to be located in Marl, to develop, manufacture, and sell each company's line of catalysts. The Germany company is a licensee of Houdry's dehydrogenation process for producing butadiene.

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Memorial Booklet Issued

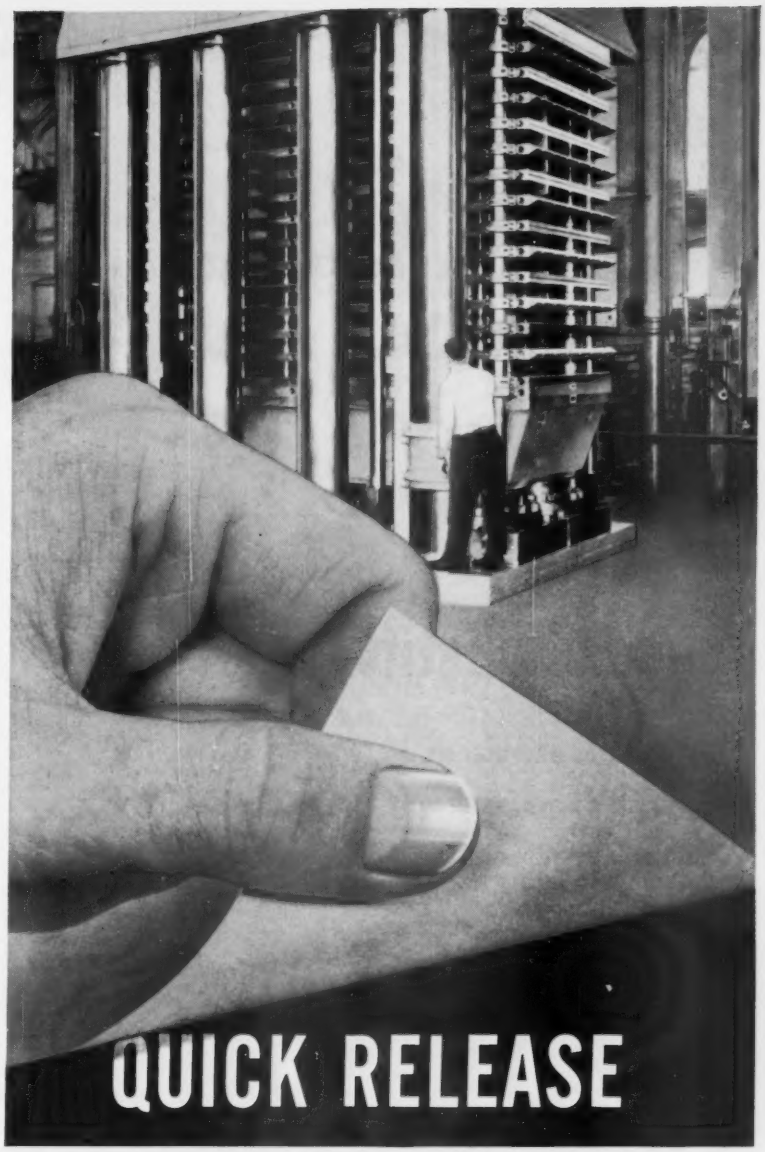
► In tribute to the memory of Dr. Stefano Oberto, who served as director of research for many years, Pirelli Company, of Milan, Italy, has issued a commemorative booklet. This booklet, over 150 pages in size, contains all the published works of Dr. Oberto, who died in October, 1958. The reproductions are made in the original language of presentation, including Italian and English. Among the articles in English are those which covered the aging fluorescence of vulcanized rubber, hysteresis and heating in vulcanized rubber, improvements in artificial aging ovens, and microhardness and microrebound measurements. Among those in Italian, are articles on control of heat during vulcanization, determination of optimum vulcanization, a method for quality control, an instrument for measuring hardness, and statistical control of quality. Dr. Oberto was associated with the Pirelli organization from 1929 until the time of his death. Copies of the memorial booklet can be secured on request to the company.

Goodrich Leases Track

► A giant test track being built by B. F. Goodrich Co., Akron, Ohio, near Pecos, Texas, will be operated under a lease agreement by Automotive Proving Grounds, Inc., a newly-organized firm with headquarters in Pecos. The new testing company was formed by Frank E. Harper who had been director of employee relations for the Tire Division of Goodrich. According to Mr. Harper, who is president of the new firm, in addition to testing tires for Goodrich, the firm will sell the services of the proving grounds to other concerns for testing automotive products.

WRG Hears Missile Talk

► The Washington Rubber Group heard a talk on the Polaris weapon system by Comdr. T. R. Rhees (Bureau of Naval Weapons), on November 30, 1960, at the Army & Navy Club, Washington, D. C. Comdr. Rhees discussed the geopolitical background against which the forces of the Free World are ranged and the role of sea power, with emphasis upon the Fleet ballistic missile Polaris and its deterrent role. The speaker also presented a motion picture on the development of the Polaris weapon system. Joseph W. Devors (U. S. Rubber) served as chairman of the meeting program.



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THE CARTER BELL MFG. CO.
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY

Vulcanized
VEGETABLE OILS

rubber substitutes

Types, grades and blends
for every purpose, wherever
Vulcanized Vegetable Oils
can be used in production
of Rubber Goods—
be they Synthetic, Natural,
or Reclaimed.

A long established and proven product.

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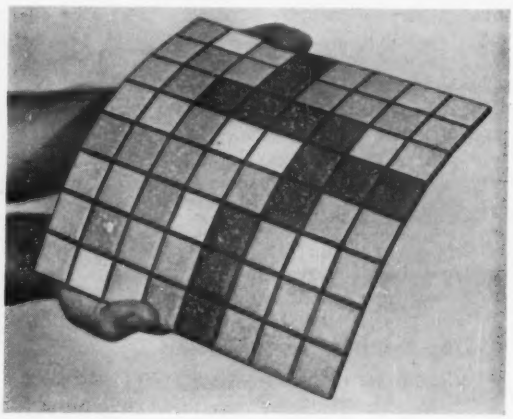
Represented by
HARWICK STANDARD CHEMICAL CO.
Akron, Boston, Chicago, Pico Rivera (Cal.), Trenton,
Albertville, (Ala.), Denver, Greenville, (S. C.)

New Goods

Rubber-Cushioned Tile

► Made of Romany-Spartan unglazed 1 by 1 inch ceramic tiles which are permanently bonded into flexible rubber grid, Ceramaflex tiles "give" slightly underfoot, making them comfortable to stand or walk on. Manufactured by United States Ceramic Tile Co., 217 4th St., N.E., Canton 2,



Ohio, Ceramaflex, because of its unusual flexibility, adjusts automatically to minor imperfections in sub-floor. The rubber grid also effectively reduces foot traffic noises and serves as an insulator against cold, heat and electric shock. Ceramaflex tiles are 9 by 9 inches square and 7/32 inch thick. The edges of the 9 by 9 units are beveled so that they lay up so tightly that joints are unnoticeable in the finished job. The tile comes in 12 decorator colors.

All-Matic Floor Mat

► A hardboard office floor mat, surfaced with a polyester laminating film to provide a high-style wood grain surface and increased resistance to chipping, abrasion and stains, has been introduced by All-Matic Corp., Hudson, Ohio. The mats are designed to protect carpeting, tiling and wood flooring under desk chairs. With their surface of Videne, a polyester laminating film produced by Goodyear Tire & Rubber Co., Akron, Ohio, the mats are said to withstand scuffing, shoe markings, and chair caster indentations. The mat comes in two sizes, 48 by 36 inches and 48 by 54 inches, with each size available in either a small or large lip design. The large lip fits desks of the new contemporary designs, while the small lip fits standard desk openings. Tapered edges on the mats permit office chairs to roll on and off without lifting.

Schenuit Names Weaver

► Frank G. Schenuit Rubber Co., Baltimore, Md., has appointed Elsworth J. Weaver to the newly-created post of technical director. In other personnel appointments, Richard N. Pierce has been named manager of product development and engineering, Russell D. Sering is sales manager of the Automotive and Truck Tire Division, and Max D. Waring has been appointed quality control manager. Mr. Sering's appointment was made in April, 1960.

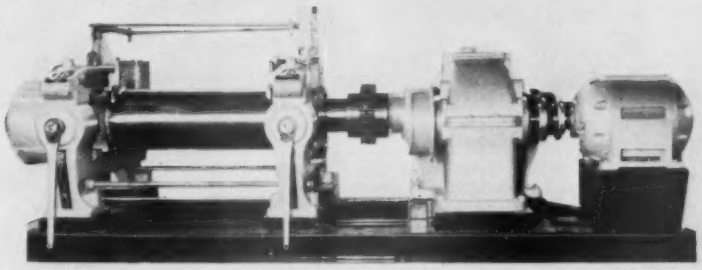
Mr. Weaver, who had been associated with Firestone Tire & Rubber Co., joined Schenuit in 1960. In his new assignment he will be responsible for coordinating and directing tire design development, laboratory work and quality control. Mr. Pierce succeeds William H. Ramsthaler who is being retained on a consulting basis after 25 years with the firm as chief development engineer. With the company for seven years, Mr. Pierce will now be responsible for tire engineering, development and testing.

Mr. Sering, formerly with General Tire & Rubber Co., succeeds F. P. Kroeger who has retired after 33 years of service with Schenuit. Mr. Waring, previously with Firestone Tire & Rubber Co., will be responsible for quality control of Schenuit products and will coordinate the technical service activities of the company.

NBS Copolymer System

► The National Bureau of Standards, under the sponsorship of the Government Synthetic Rubber Program, has developed a precise procedure for determining copolymer composition. According to NBS, this method, in which the sample is burned to produce water and carbon dioxide, has been used to measure the ratio of bound styrene to butadiene in samples of synthetic rubber. Other copolymers containing monomers differing significantly in carbon-hydrogen ratio could be analyzed with little change in the present method.

A need for the determination of copolymer composition arose as part of NBS' investigation of natural and synthetic rubbers. The bureau reports that although the new procedure is precise, it is too time consuming to be of value in routine copolymer determinations. However, it has been used to measure the copolymer composition of reference standards, which then served as the basis for the development of more rapid techniques.



Here is the Bellwether Mill of the Rubber and Plastics Industries

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2½" x 7" through 26" & 26" by 100" roll diameters and widths.

Singled out from the broad range of Bolling equipment for the rubber and plastics industries, this unit, the 60" mill has become an outstanding leader in the field. Into it Bolling's 30 years' close-hand knowledge of milling conditions and requirements has built optimum reliability and economy. Original cost—reasonable. Maintenance—minimum. Production—pleasingly high. Construction—rugged in the extreme. Installation—easy, since several types of drive are available. The 60" mill illustrated has Stewart Bolling's own direct-connected drive, mounted on one-piece base.

Other Bolling mills embody the same sound, successful principles of design and operation. Get *all* the details concerning this bellwether in its class.

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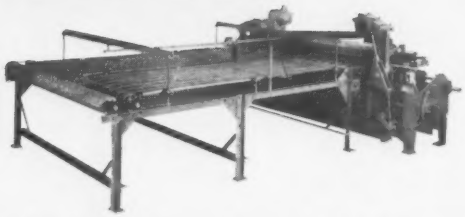
ALFA CUTTERS

3 Precision-Built Machines Designed For A Wide Variety of Cutting Jobs!

AUTOMATIC STOCK CUTTER



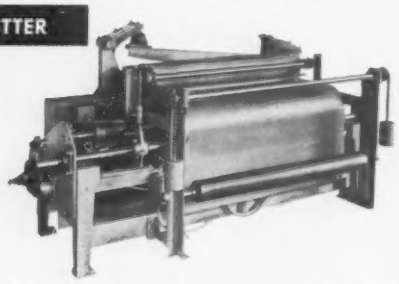
• A high production, self-contained machine, the Alfa Stock Cutter is complete with motors, variable speed control, synchronizer and conveyors. Measures and cuts to length a continuous material flow from processing machines or yardage rolls.

Quickly and easily adjusted to cut infinite lengths. A clean accurate cut is assured and design is flexible to suit conditions.

Sizes: 30" — 42" — 60" — 72" — 84" — 90".

BATT CUTTER

Cotton
Fiber-Glass
Felts
Padding
Plastics
Rubber



• For automatic cutting of yardage rolls or may be synchronized to a continuous processing line. Accurately cuts wide range of materials — battings, plastics, textiles, paper, rubber stock and sponge. Fully self-contained, the machine is complete with motor and synchronizer and meets a wide range of cutting problems.

Length of cut is variable and easily regulated by quick change gears or other means depending on requirements.

Sizes: 30" — 42" — 60" — 72" — 84" — 90".

ELECTRIC POWER SHEAR

Rubber
Foam
Sponge
Vinyl
Paper Board
Textiles

• A compact heavy duty machine, designed for manual operation. Ideal for many cutting requirements — handles materials from flat folds, rolls or sheets. The clamp is automatic and adjustable for pressure and clearance. The table is heavy wood construction with metal straightedge. The foot switch activates the knife and can be placed in any position convenient to the operator.

Sizes: 36" — 48" — 60"

SPADONE MACHINE CO. INC.

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Representative for Alfa Machine Co.

Vinyl Window Sheeting

► Shade is a new vinyl window sheeting which is said to admit sunlight through ordinary windows without glare. Manufactured by Transeal, Ltd., 902 North Avenue, Plainfield, N. J., it is made exclusively with Krene vinyl, a product of Union Carbide Plastics Co. Shade is easily applied by wetting the windowpane, pressing the vinyl sheeting against it and squeezing out the excess water. It is removed by prying up one corner and it can then be stored for re-use. The sheeting is custom cut to size, and Transeal claims that it is washable and moisture- and soil-resistant as well as resistant to tearing, abrasion and cracking. It is available in a variety of colors, ranging from filtered white to olive green transparent. Three of the colors are said to absorb heat as well as glare.

Goodrich Food-Handling Glove

► A glove designed for food handling has been introduced by B. F. Goodrich Industrial Products Co., Akron, Ohio. Called Style 5393, the glove is made from a tough new rubber compound which is said to have 30 per cent greater tear resistance than the next best rubber glove tested. The glove has crinkle-finish palm and fingers for easier grip, and curved fingers for comfort and reduced fatigue. According to the company, the glove will resist puncture by chicken bones or any other sharp pieces involved in food processing.

Rain-Zip Coverall

► Double Jay Mfg. Co., 332 West 9th St., Kansas City, Missouri, has developed a one-piece, zip-on "rain-zip" coverall which is said to give complete protection against rain, sleet and snow. It is made of a new, heavy-duty vinyl which, according to the company, is unaffected by heat or cold. The coverall folds into a small carrying case and may be used by outdoorsmen for sports or work, city or country.

POLYSAR LATEX 781

A Vinyl Pyridine Latex with an adhesive strength equal to the breaking strength of nylon cord

Polysar* Latex 781 will improve almost every kind of water based rubber-to-textile adhesive. For example, Polysar Latex 781 compounds will produce bonds between rubber and nylon tire cord that are as strong as the nylon cord itself. Manufacturers of V-belts and conveyor belts can also benefit from the superior adhesive properties of this versatile latex.

Polysar Latex 781 contains a unique stabilizer system which gives the latex good freeze-thaw stability and superior chemical stability in the presence of preformed resorcinol formaldehyde resins. Other features of this latex include good mechanical stability and low viscosity which contribute to easy and trouble-free pumping and storage.

**Trade Mark Reg'd.*

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tests prove adhesive power of Polysar Latex 781

TIRE CORDS	2 ply nylon	2 ply rayon
Denier	840	1100
Average undipped breaking strength (pounds)	26	25.5
Approximate cord diameter (in.)	0.021	0.024
Adhesion results (pounds pull, using dip recipe below)	22.5	25.0
Pounds Pull using Polysar Latex 781 alone	24.5	-

typical laboratory dip recipe

(using a rubber to resin ratio of 100/20)

INGREDIENT	Parts by Weight Dry	Wet
Polysar Latex 781 (42%)	80.0	190.5
Polysar Latex IV	20.0	47.6
Resorcinol	13.0	13.0
Formaldehyde (36.7%)	7.0	19.1
Sodium Hydroxide (10%)	0.8	8.0
Water—for resin solution	-	306.5
Water—for dilution	-	19.3
TOTALS . . .	**120.8**	**604.0**

There's a Polysar* rubber for every purpose . . . General Purpose Rubbers—Butadiene-Styrene Copolymers; Oil Resistant Rubbers—Butadiene-Acrylonitrile Copolymers; Special Purpose Rubbers—Butadiene-Styrene Copolymers; Butyl Rubbers—Isobutylene-Isoprene Copolymers; and Latices.

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POLYSAR

Distributors in 43 countries

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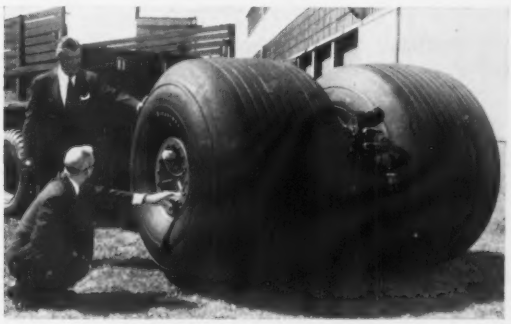
Firestone Liquid Transporter

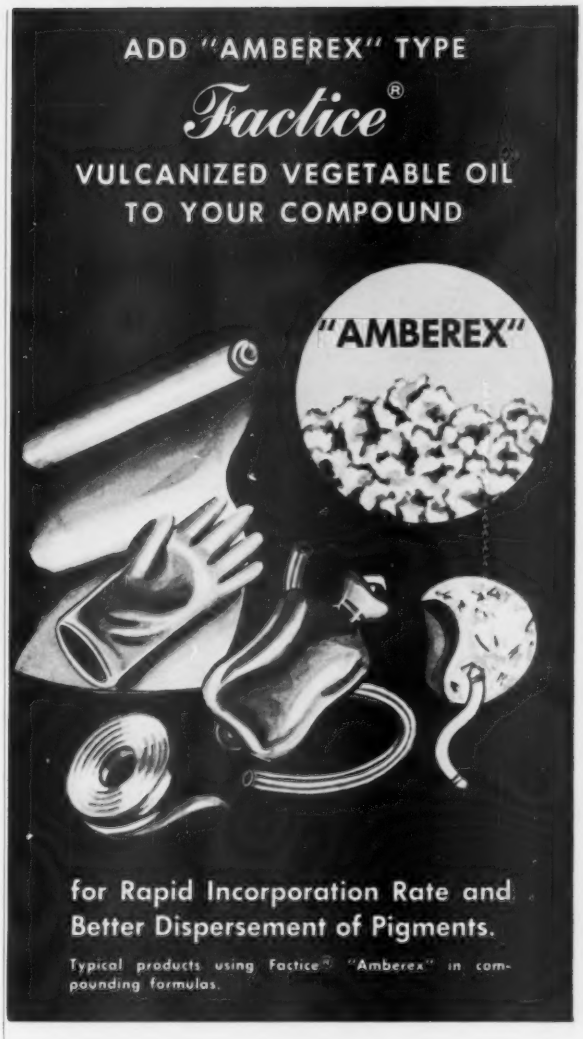
► Firestone Tire & Rubber Co., Akron, Ohio, has developed a portable gasoline station said to fit the U.S. Army's pentomic concept of swift, mobile, self-supporting fighting forces. Called a rolling liquid transporter, the vehicle consists of a carriage, two huge neoprene tires, and other accessories. The feature of the transporter is that



the tires are filled with gasoline instead of air, and each tire has a capacity of 500 gallons. Although the vehicle is intended primarily to haul gasoline, it also could be used to transport water to remote areas, the company states. Tests by the manufacturer have shown that the neoprene tire will seal itself when penetrated by small arms projectiles. According to Firestone, the transporter will float in water and can be dropped from an airplane by parachute. In addition, it can move easily on almost any type of terrain because the ground pressure of its wide footprint is only three to fifteen pounds per square inch, the company states.

Rogers Rubber Pendulums

► Molded rubber pendulums, designed to permit the flow of aviation lubricating oil from the tank to the engine regardless of the airplane's position have been developed by Rogers Corp., Rogers, Conn. Using a specially-developed process, the company has designed pendulums in a variety of materials for aircraft application, and believes that the principle is adaptable for off-the-highway earthmoving equipment which must operate at steep angles. In one application, a Viton A pendulum has a mechanically bonded stainless steel weight at one end and molded-in convolutions throughout the length of the tube. A stainless steel bushing is bonded-in at the other end to provide a solid attachment to the tank. In operation, the extremely flexible rubber length flops into the oil reservoir no matter what angle or position the airplane is in, providing a positive, uninterrupted flow of lubricant at temperatures from —40° to +350°F.



The Amberex type of Factice® is made from various kinds of vegetable oils and in various degrees of polymerization. All are light colored, transparent, free from chlorine and have practically no ash.

There are six different Amberex types, each having properties for specific applications. The selection of the proper Factice® for a compound is important. Send us your formula for our suggestions. All formulas held in strict confidence. Our trained staff will help in selecting the proper vulcanized vegetable oil for your need . . . Factice®, White, Brown, Neophax or Amberex.

Factice Vulcanized Oil

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You rave so much about how MAGLITE solved your scorch problems with neoprene, how was I to know that it wouldn't do the same for my cooking?

Maglite®

The performance-proved magnesium oxide

Want to eliminate scorch damage in neoprene processing? Specify MAGLITE D. Tests prove that it offers better scorch protection for neoprene than any other magnesium oxide you can use. MAGLITE D also helps solve storage problems since it occupies about one-third the warehouse space as many of the lightweight magnesias. The benefits of using MAGLITE K, M, or Y for other elastomers and certain product or process requirements are equally impressive. For samples and technical information write to

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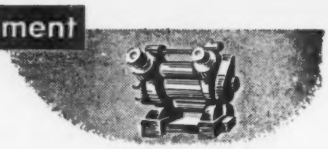
New Equipment



Automatic Dipping Machine

► A fully automatic, diversified dipping machine is being marketed by Akron Presform Mold Co., 2038 Main St., Cuyahoga Falls, Ohio. Untouched by human hands, dipped goods flow from this machine at the rate of 12,000 items per hour, the company reports. According to the manufacturer, the unit, a six-station machine, preheats forms, dips, thermosets film, cools, strips and sorts, completing the cycle in as little as 36 seconds. The machine is equipped with cycle regulating gages which are calibrated in seconds so the time cycle and temperatures can be set exactly. Up to 20 forms may be mounted on each form-carrying plate and three different items can be made simultaneously and automatically sorted. Compactly built, the machine requires floor space of only 8 by 10 feet, and stand 5 feet high. The manufacturer states that typical products produced on this machine include grapes, small bulbs, nipples, pen sacs, finger cots, handlebar grips, chair leg tips, and gloves.

Rotating Shelf Asphalt Oven

► While specifically designed to meet ASTM isolation of rotating shelf motor and reduction Designation D6-39T on Loss on Heating Oil and Asphaltic Compounds, simple removal of rotating shelf and extended shaft, allows this gravity con- analytical laboratory and general chemical work. Co., 138th and Chatham St., Blue Island, Ill., vection unit to become a utility oven suitable for According to the manufacturer, Blue M Electric gear drive system from chamber temperatures results in cool, long life-time, non-vibrating operation with no repairs or servicing required.

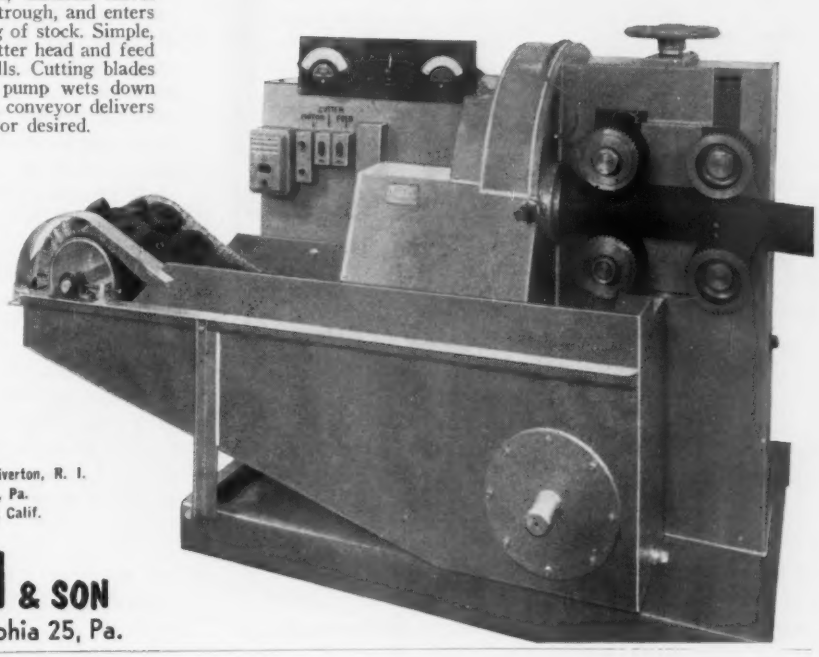
Lightnin Portable Mixers

► A completely new line of Lightnin propeller-type portable mixers for fluid agitation in process positive drive chuck, permitting fast, accurate coupling in one simple operation, the company industries has been developed by Mixing Equipment Co., Inc., 170 Mt. Read Blvd., P.O. Box 1370, Rochester 3, N. Y. Designed as an integral unit, the new mixer offers increased mixing efficiency, improved handling convenience, and maintenance-free operation. The manufacturer reports that the units will be marketed in sizes ranging from 1/8 hp to 3 hp, and will also be available in a fixed mounting design in all sizes except the 1/8 hp size. According to the company, the new Lightnin mixers offer not only direct-drive speeds

GOODMAN 6" Capacity SLUG CUTTER

The Goodman Model 6-24 Cutter is a rugged, accurate unit for producing large slugs (up to 6" dia.) from uncured rubber. In a normal installation, material leaves the extruder, passes through a cooling trough, and enters the Cutter directly, eliminating handling of stock. Simple, easy-to-reach controls vary speed of cutter head and feed rolls, and feeding pressure between rolls. Cutting blades (4 furnished) are hardened steel. A pump wets down material at the cutting point. A built-in conveyor delivers stock to any receptacle or other conveyor desired.

Rubber Slugs up to 6" dia., 1/4" to 24" long



Capacity—up to 6" dia.
Slug Length—¼" to 24"
Feed—Variable 2 to 60 ft./min.
Delivery—10 to 320 Slugs/min.
Size—6½' long, 5' wide, 5¾' high

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TLARGI, U.S.C.
U. S. Rubber Company
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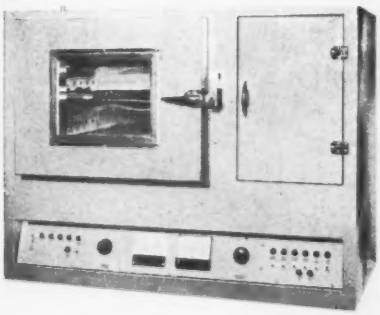
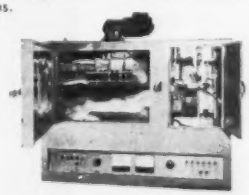


Orec 0300 Series employ an *electronic-chemical loop feed back servo system to achieve and precisely maintain chamber ozone concentrations.



Orec 0300 with Dynamic Stretching Apparatus.
** patent pending*

OZONE:

- TEST CHAMBERS, 6 MODELS
- AUTOMATIC CONTROL SYSTEMS
- RECORDING INSTRUMENTATION
- STRETCHING APPARATUS
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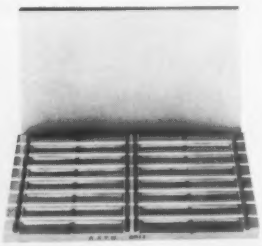
Designed to ASTM Standards or YOUR Specifications



D813, Fig. 3
DeMattia,
Flex Test.

ANOTHER HOGGSON MOLD
Designed for a Specific Need

D813, Fig. 3 DeMattia Flex Test was designed to answer a specific problem. Hoggson engineers are known throughout the world for reputable service in supplying manufacturers of rubber, plastic and synthetic products with precision molds and dies for test samples or actual production. Send your requirements for Hoggson's suggestions. Ask for literature.

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MICROFINE—
KILN DRIED POWDERED LIMESTONE finer than 300 mesh

EXCELLENT FOR RUBBER FILLER

—in 50 and 80 pound bags. Prompt shipments, any quantities. Shipping points—Carey and Spore, Ohio.

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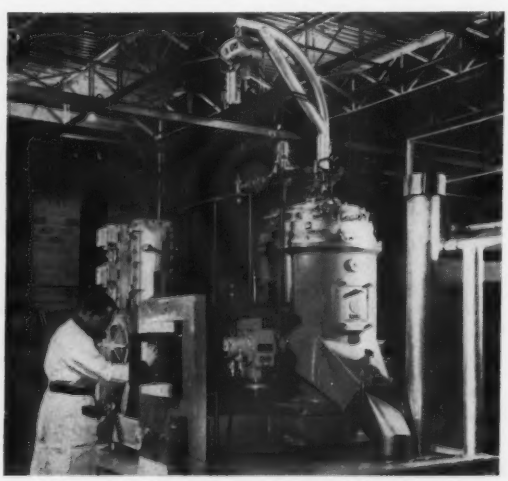
of 1750 rpm and 1150 rpm with higher impeller heads, but also a gear-drive model speed of 350 rpm providing up to 45 per cent more flow than previous units. Gear drive models are said to be quiet running, leak-proof, and equipped with single reduction, internal helical gears for compact drive, additional strength, and improved gear life. Both direct and gear-drive models rotate clockwise. A unique feature of the new series is its states. Its location is always above the maximum fluid level of the mixing tank. A flat on the mixer shaft insures a positive grip and correct position with each shaft insertion.

Low Capacity Foam Unit

► In a line of automatic foam machines in capacity ranges to 175 pounds a minute, Gabriel Williams Co., Inc., 77 Mill Road, Freeport, L. I., N. Y., has added Model No. 100 with a capacity to 450 grams a minute. According to the manufacturer, this unit has been designed for the testing or developing of all types of urethane formulations, which can be duplicated in commercial operation. Available in 2, 3 or 4 components, the automatic mixing head is included as standard equipment. The unit can be used for the development of prepolymers, polyesters, diamer base of halogenated hydrocarbon foams in the densities desired. Though rated at 450 grams per minute capacity, the unit can be operated at any lower pre-determined flow desired. Ratio of proportioning is 1:1 to 50:1.

Pfaudler Portable Centrifuge

► A portable CNS-150/151 Titan centrifuge, said to be capable of processing 3,000 to 6,000 gals/hr of liquid, is available from Pfaudler Co., 1086 West Avenue, Rochester, N. Y., on a rental basis for production test and pilot runs. According



to the manufacturer, the CNS-150, largest centrifuge in the Titan line, was made portable to fill the need for in-plant, on-stream centrifuge testing. Smaller size portable Titans are also available for field trials. The unit is a self-cleaning, disc type centrifuge which develops a settling force of 7,800 times gravity. Baffles extending outwards from the center to the periphery of the bowl direct product flow radially. Solids accumulate between vanes around the "V" shaped outer walls of the bowl and are periodically ejected through slots 5 inches long by ⅜ inch high, opened hydrostatically by automatic controls. The manufacturer states that this construction makes the machine especially efficient for many clarifications, concentrations and extractions difficult to accomplish otherwise.

Powder Dispenser-Collector

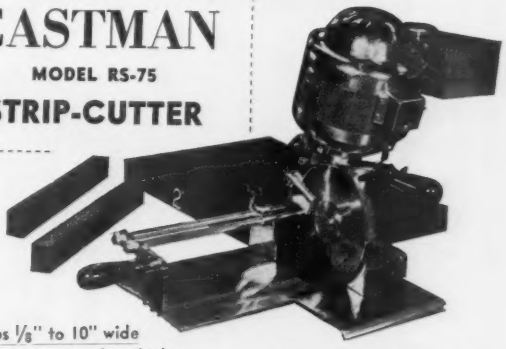
► The unit, manufactured by G. F. Goodman & Son., N.E. Corner Richmond St. and East Columbia Ave., Philadelphia 25, Penna., is designed for the application of zinc stearate to uncured rubber and re-collect. According to the manufacturer, the features of the machine are: powerful sustained suction; extremely quiet operation; may be easily moved about; continuous operation; requires relatively small floor space; nylon dust bag is reinforced with heavy canvas at box junction and clamped in place by 16 wing nuts; and can be put into operation in minutes. The nylon filter bag is 24 x 24 x 60 inches and has an effective surface of 44 square feet. The unit has two totally enclosed 1-60-110V motors, a 1/3 hp—3450 for the blower and 1/3 hp—1750 for the agitator. A single lever control to all discharge openings is used for instant cut-off or volume control. The unit has a net weight of 250 pounds, and its dimensions are 28 inches wide, 46 inches long and 104 inches high.

Ross High Speed Disperser

► New stationary tank type dispersers have been introduced by Charles Ross & Son Co., Inc., 158 Classon Ave., Brooklyn 5, N. Y., in various sizes ranging from 5 gallons to 3,000 gallons. The units feature high speed dispersion type impeller of either sawtooth disc type or with closed design multiple action millhead for producing the finest ultimate grinds or dispersions. Impeller and shaft are of stainless steel and operate at speeds up to 5,000 rpm. Tremendous impact and shear are developed which are reported to result in mixing and dispersing most paste type products in considerably less time than in other type stationary tank mixers. Tanks are provided either plain or jacketed, with several optional type outlet gates, and with legs to raise the gate to any required height above floor.

Now! — a HEAVY DUTY, PORTABLE
RUBBER STRIP-CUTTER

EASTMAN
MODEL RS-75
STRIP-CUTTER



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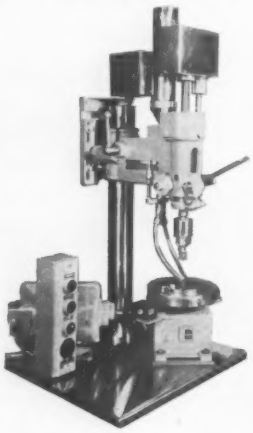

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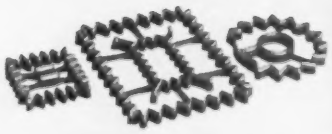

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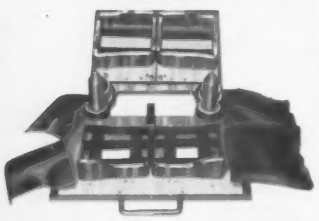

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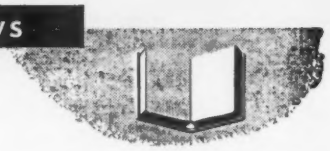
Reviews



International Rubber Directory. (Third Edition). Published by Verlag fur Internationale Wirtschaftsliteratur GmbH, Bockhornstrasse 31, Zurich, Switzerland, 6 x 9 in. 676 pp. $17.00.

(Copies available from RUBBER AGE)

This third edition of the "International Rubber Directory" is testimony to the continuing growth and vitality of the rubber industry throughout the world in that several hundred new rubber goods manufacturers have been added since publication of the previous edition. These new manufacturing enterprises have not only been established in traditional areas, but in those countries which heretofore had only a small interest in rubber processing. The third edition also includes, for the first time, an alphabetical listing of brand and trade names common to the rubber industry.

Since the directory is published in English, German and French, the editors have included a most useful German-English-French, English-German-French and French-German-English vocabulary. A handy buyers' guide of suppliers to the rubber industry is also included. An alphabetical listing of companies found in the directory is appended as is an index to advertisers.

These days, when more and more trade is assuming international aspects, a directory of this type is particularly welcome. All listings are clear and concise. The publishers have apparently expended every effort to see to it that all entries are pertinent and up-to-date. This international directory should prove of help to all companies concerned with world-wide activities on rubber machinery and equipment, chemicals and compounding ingredients, and special services.

•

Synthetic Rubber Technology. Vol. I. By W. S. Penn. Jointly published by Palmerton Publishing Co., Inc., 101 West 31st St., New York 1, N. Y. (Western Hemisphere) and Maclaren & Sons, Ltd., 131 Great Suffolk St., S.E. 1, London, England (Eastern Hemisphere). 5½ x 8¼ in. 326 pp. $8.50.

"Synthetic Rubber Technology" is a book on practical compounding. Mr. Penn, who most certainly has had a vast experience himself, and who no doubt has had contact with the training of younger people, has recognized what sometimes appears to be a wide gap between the theoretical aspects of the rubber business and actual practice.

The young rubber compounder normally has had an excellent schooling in theory and has fine theoretical texts available to him. However, he earns his money by manufacturing a product from rubber and in conducting experiments directly related to this process.

Mr. Penn himself says: "Most scientists in the rubber industry, to use 'rubber' in its widest sense, are primarily concerned with the compounding and processing of elastomers, however interesting the chemical side may be. This book has been written to meet the need of these technologists and is entirely practical in its approach to the subject." Mr. Penn seems to have fulfilled his purpose quite successfully. The arrangement of the material is clear, logical, and orderly. The short, numbered, clearly labelled sections are particularly helpful. The language is concise and easily understood.

Admittedly, the sources of information are chiefly suppliers' literature. It might be said that this information is available to any technologist for the asking. On the other hand, Mr. Penn has done a real service in combining this information in one place and assembling

it in such a logical fashion. Although very little other information appears to have been added, we have the advantage of Mr. Penn's experience in his editing of the material.

This book will appeal most to the young compounder, because the man of average experience will find very little new here in the chapters dealing with his own field. He will feel that the book has not gone far enough in the familiar fields, and he may wonder why references at least have not been given which might lead to more advanced discussions or more details in his field. However, he will read the chapters dealing with other fields with considerable interest, and he will be helped in the application of a polymer unfamiliar to him.

At the other end of the scale, the new college graduate, once he has been exposed to some phase of the rubber industry long enough to learn the language and to know something of the equipment and general processing steps, should find this book a very helpful guide. It should shorten the time needed to convert him from a trainee to a full fledged compounder.

Mr. Penn starts by describing basic laboratory and factory practice with ample reference to ASTM methods and the corresponding British standards. He discusses the use of these polymers in products such as tires, shoes, cables, cements, and others. His emphasis is on the makeup of the formula and its processing through milling, calendering, and extrusion. His discussion of molding and curing and the compounding steps taken to correct defects at this point is only cursory.

Unlike many other texts this book is not intended to be a survey of past work, nor is it historical in any sense, and of course it does not contain a complete bibliography of literature. It is a book of basic practical information.

J. H. FIELDING

•

Runnerless Molding. By Ernest P. Moslo. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 5 x 7½ in. $4.95.

This book provides a concise survey of the theory, design, applications and economics of runnerless molding. It describes in detail the various techniques of injection molding accomplished without the removal of a sprue and runner system on each injection molding shot.

The author is president of his own company, Moslo Machinery Company of Cleveland, Ohio. He includes discussions of such recent developments as precompression and sequential molding. A wealth of explanatory drawings shows the actual construction of nozzles used for runnerless molding, manifolds and mold equipment. Primarily directed to the plastics, rubber, and related industries, the book demonstrates the ways in which runnerless molding may be employed to eliminate sprue scraps, cut labor costs, minimize rejects and greatly speed production.

•

Polypropylene. By Theodore O. J. Kresser. Published by Reinhold Publishing Co., 430 Park Avenue, New York 22, N. Y. 5 x 7½ in. 268 pp. $6.50.

Properties, production, and applications of polypropylene are brought together in this book, which is written in easy-to-understand language. It is the first book to offer information on this increasingly important thermoplastic to readers without special training in polymer chemistry. Emphasis is placed on the relationship between polypropylene development and the future of high polymers generally. Sufficient information is contained on basic principles of stereochemistry to point up polypropylene's unique qualities.

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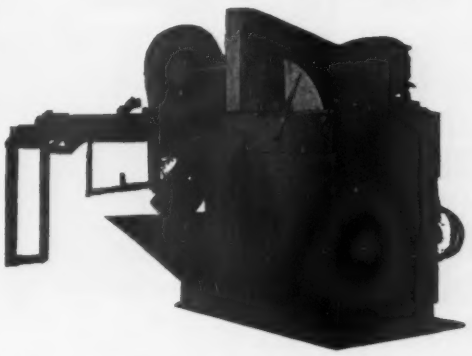

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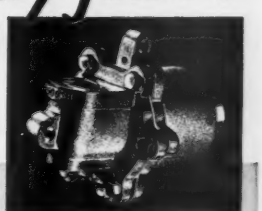

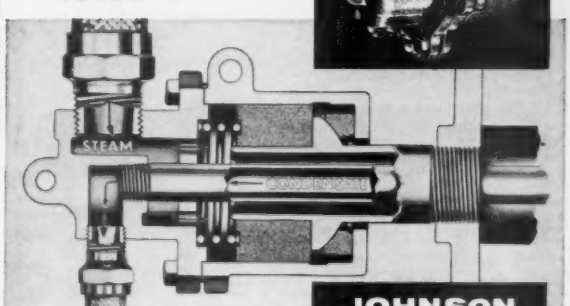

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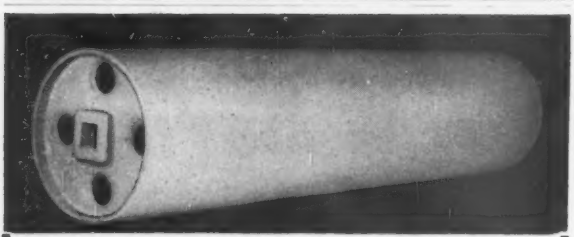

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fessor Guillo Natta on discovery and development of the material. Sections deal with applications, present limitations and future possibilities. One entire chapter is devoted to application in the packaging industry. Salesmen of polypropylene products and purchasing agents, manufacturers, and those who lack time or specialized training to read the presently scattered literature, will find this book of value.

BOOKLETS, CATALOGS, etc.

Accelerators, Pigments and Plasticizers for Hycar Rubber. (Manual HM-7). B. F. Goodrich Chemical Co., 3135 Euclid Ave., Cleveland 15, Ohio. 8½ x 11 in. 64 pp.

This comprehensive booklet is comprised of four sections: curing systems; pigments; plasticizers; and mineral rubber in hard Hycar stocks. The section on curing systems covers rate of cure, optimum cure, state of cure, importance of uniform sulfur dispersion, zinc oxide as a recipe component, accelerators, test procedures, properties of curing systems, and peroxide cures. Discussed in the pigment section are function of cure, carbon blacks, non-black pigments, colored stocks, transparent stocks, magnesia as a loading pigment for high-temperature-resistant compounds, Alon C in high-temperature-resistant Hycar compounds, and non-black pigments in Hycar 1002. The plasticizers section discusses the function of plasticizers, compatibility, bleeding plasticizers, reducing plasticizer addition time, and the effect of selected plasticizers on various Hycar nitrile rubbers.

•

The Profitable Present and the Fabulous Future of Urethane Foams. Mobay Chemical Co., Penn Lincoln Parkway West, Pittsburgh 5, Penna. 8½ x 11 in. 24 pp.

This brochure has been prepared as a dual purpose pictorial progress report and designer's fact file on industrial and commercial applications for urethane foams. The booklet traces the development of urethane foams from their early days of fabrication to the multiplicity of end-use functions that now mark the fast-expanding horizons for these materials. A number of special industrial categories are treated separately in the well-illustrated text, ranging from the more familiar cushioning applications to exotic experiments geared to the space age. Property and performance data relating to such fields of use as insulation, structural panels, missile components, industrial packaging, acoustical artifacts, void-filling and potting compounds, are well-defined for practical reference at the material specifying level.

•

PVP Formulary. (Booklet No. AP-98). Antara Chemicals Division, General Aniline & Film Corp., 435 Hudson St., New York, N. Y. 8½ x 11 in. 22 pp.

This guide to new and improved products incorporating polyvinylpyrrolidone includes formulations for more than 30 specific products in five major groups: cosmetics and toiletries, pharmaceutical and veterinary products, soaps and detergents, adhesives, and coatings. Aerosol, aqueous, and organic-solvent systems are described, and details for individual products are supplied. The characteristics of PVP are noted in a preface to each of the groups. New applications for both industrial and pharmaceutical grades are arranged for easy reference.

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MARKET REPORTS

TRENDS
NEWS
PRICES

Natural Rubber

The price of natural rubber on the New York Commodity Exchange moved in a range of 163 points since our last report (January 3), high for the period being 29.63c reached on January 4 and 5, and low being 28.00c reached on January 20. The average price of spot rubber for the month of January was 28.77c based on 21 trading days. This compares with an average of 28.81c in the previous month.

Analysts at Merrill Lynch, Pierce, Fenner & Smith point out that any possibility of a sudden sharp decline in rubber prices has been arrested by continuing dealer and trade interest in the intermediate and distant delivery months.

Another supporting factor in the market has been the constant covering by shorts who sold as long as seven or eight months ago when rubber futures were quoted at 10c higher.

Little Enthusiasm

At the moment, there is no widespread enthusiasm to be found in the rubber industry. Many feel that futures are too high to buy and, on the other hand, too low to sell. Another consideration which has added to uncertainties is the action to be taken by the new administration to bolster the economy. At present, rubber consumers are suffering from an over-production of products. Unless the public begins to show an increased interest in new automobiles, not much can be done to bolster demand from that sector. Consequently, tire producers are faced with the problem of adjusting their output to conform to the needs of the automobile industry.

An additional consideration is the labor picture. Rubber tire workers' contracts run out starting in April and the automobile industry is due to renew contract talks in August.

Russian Purchases

It has been reported that the Soviet Union will step up its purchases of natural rubber on the world market this year. Reports state that Russia will purchase $76 million (U.S.) worth of Malavan rubber this year. Last year, Russia bought about $50 million worth of rubber.

Ceylon, meanwhile has contracted to buy an additional 24,500 metric tons of rice from China in exchange for 2,817 tons of rubber. The contract is apart from the 1960 rubber-for-rice deal under which Ceylon has already bought 160,000 tons of rubber from China.

A rumor out of China states that the General Services Administration will resume stockpile sales of natural rubber regardless of price, once the new administration takes firm hold. This has been denied by Washington, but the trade is still somewhat nervous over the possibility of such a move.

NEW YORK, FEBRUARY 1, 1961

Price Data

Closing Rubber Prices on New York Commodity Exchange

FROM JAN. 1 TO JAN. 31

Jan.	Spot	Mar.	May	July	Sales
1	....	....	....	....	..
2	....	....	....	....	..
3	29.63	29.80	29.80	29.80	89
4	29.63	29.75	29.85	29.85	42
5	29.50	29.50	29.50	29.50	33
6	29.50	29.60	29.50	29.50	32
7	....	....	....	....	..
8	....	....	....	....	..
9	29.50	29.40	29.35	29.30	61
10	29.50	29.55	29.50	29.40	29
11	29.25	29.25	29.15	29.15	50
12	29.00	28.95	28.70	28.70	82
13	29.13	29.00	28.85	28.85	18
14	....	....	....	....	..
15	....	....	....	....	..
16	28.63	28.40	28.35	28.35	72
17	28.50	28.35	28.12	28.10	27
18	28.25	28.10	27.90	27.80	20
19	28.25	28.00	28.00	28.00	32
20	28.00	27.90	27.90	27.75	22
21	....	....	....	....	..
22	....	....	....	....	..
23	28.25	28.20	28.00	28.00	129
24	28.25	28.00	27.90	27.85	10
25	28.25	28.25	28.00	28.10	32
26	28.38	28.45	27.85	27.85	23
27	28.38	28.30	27.95	27.85	9
28	....	....	....	....	..
29	....	....	....	....	..
30	28.13	27.75	27.75	27.75	18
31	28.13	28.15	27.75	27.75	13

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.28⅛
Feb.	.28⅛
Mar.	.28⅛
Thin Latex Crepe:	
Spot	.30¾
Thin Brown Crepe, No. 2	.24¼
Flat Bark Crepe	.19

London Market
(Standard Smoked Sheets)

Mar.	27.75 — 29.90
Apr.-June	27.90 — 28.04

Singapore Market
(Standard Smoked Sheets)

Mar.	25.79 — 25.87

Middling Upland Quotations

	Dec. 30	Jan. 31		
	Close	High	Low	Close
Mar.	32.12	32.18	32.18	32.16
May	32.61	32.69	32.69	32.63
July	33.01	33.20	33.10	33.12

Notes & Quotes

According to Ralph Dubrowin of the Natural Rubber Bureau, natural rubber is economically in a very healthy position and likely to remain that way for some time to come. Returning to the United States after an eight-week tour of Far East rubber plantations, Mr. Dubrowin observed that for the past several years, natural rubber producers have been selling all they produced. For the last two years, he said, more natural rubber has been sold than produced, with the excess coming out of stocks.

Synthetic Rubber

Final figures made available by the Rubber Manufacturers Association indicate that 1,436,524 long tons of all types of synthetic rubber were produced in the United States in 1960. This is about 57,000 long tons more than were produced in the previous year.

During 1960, consumption of synthetic rubber in the United States totaled 1,075,849 long tons, almost identical with the 1,072,726 long tons consumed in 1959. The 1960 synthetic consumption figure represented 69.18 per cent of all the new rubber consumed.

As for exports, during 1960 domestic producers of synthetic exported 342,074 long tons compared with the 290,468 long tons exported in the preceding year. In consideration of the drop in new rubber consumption in 1960, synthetic rubber did very well indeed.

New rubber consumption in 1960 dropped by approximately 72,000 long tons below 1959 figures. Natural rubber consumption in 1960 dropped by some 76,000 long tons. We would wish to read much significance into these figures but perhaps some significance can be drawn from the fact that synthetic consumption was fractionally better; synthetic production was up as were synthetic exports.

In balance, natural rubber imports were down, and so was consumption. The tonnage decrease in new rubber consumption came entirely from the natural side. One additional factor should be noted. The average price of No. 1 Ribbed Smoked Sheet in 1960 was 38.09c. Was this the factor that contributed to the end result?

Continuing Battle

The struggle between natural and synthetic rubber continues and, in the opinion of many, the battle has yet to be won. It is apparent that the major weapon of both sides will be price. Let us review some history.

On the New York market, the price of natural rubber declined from 47c a pound in June, 1960 to 34c a pound in October. After this decline, Shell reduced the price of polyisoprene from 35c a pound to 32c. When natural rubber dropped to 30c a pound, Shell cut the price of polyisoprene to 27c a pound. Natural rubber has now eased to a 28-29c level.

Where all this will lead no one knows for sure. Synthetic rubber producers are said to feel that the price for their commodity is heading lower. Natural rubber producers, for their part, are making strong efforts to increase production. It is generally agreed that only increased production will permit a lowering of natural prices. The settlement of the problem, if ever one arises, will probably hinge upon the newer natural-synthetics—the way they hit the market, their price and the volume in which they are produced.

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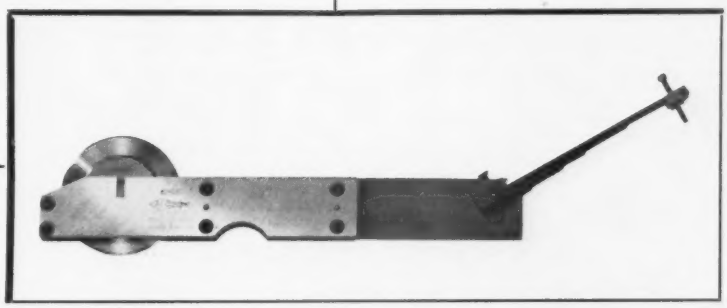

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Hycar 1052	.5000 [2]
Hycar 1053	.5000 [2]
Hycar 1072	.6400 [2]
Hycar 1203	.4600 [2]
Hycar 1312	.5000 [2]
Hycar 1411	.6200 [2]
Hycar 1432	.5900 [2]
Hycar 1441	.6200 [2]
Paracril AJ	.4850 [2]
Paracril B and BJ	.5000 [2]
Paracril BLT and BJLT	.5000 [2]
Paracril C and CLT	.5800 [2]
Paracril CV	.6300 [2]
Paracril D	.6500 [2]
Paracril 18-80	.6000 [2]
Paracril OZO	.4600 [2]
Polysar Krynac 800	.5000 [2]
Polysar Krynac 801	.5800 [2]
Polysar Krynac 802	.5000 [2]
Polysar Krynac 803	.5000 [2]

Butadiene-Styrene Types

Ameripol 1000	.2410 [2]
Ameripol 1001	.2410 [2]
Ameripol 1002	.2435 [2]
Ameripol 1006	.2410 [2]
Ameripol 1006 (crumb)	.2475 [2]
Ameripol 1007	.2410 [2]
Ameripol 1009	.2475 [2]
Ameripol 1009 (crumb)	.2590 [2]
Ameripol 1011	.2475 [2]
Ameripol 1012	.2425 [2]
Ameripol 1012 (crumb)	.2490 [2]
Ameripol 1013	.2410 [2]
Ameripol 1013 (crumb)	.2615 [2]
Ameripol 1500 and 1501	.2410 [2]
Ameripol 1502	.2410 [2]
Ameripol 1665	.1900 [2]
Ameripol 1703	.2060 [2]
Ameripol 1705	.2035 [2]
Ameripol 1707	.1910 [2]
Ameripol 1708	.1910 [2]
Ameripol 1710	.1885 [2]
Ameripol 1712	.1885 [2]
Ameripol 1805	.1550 [2]
Ameripol 1808	.1480 [2]
Ameripol 1809	.1545 [2]
Ameripol 1810	.1400 [2]
Ameripol 4600	.2410 [2]
Ameripol 4601	.2410 [2]
Ameripol 4651	.1770 [2]
Ameripol 4659	.1820 [2]
Ameripol 4660	.1870 [2]
Ameripol 4664	.1845 [2]
Ameripol 4667	.2080 [2]
Ameripol 4700	.1750 [2]
Ameripol 4756	.1545 [2]
Ameripol 4758	.1450 [2]
Ameripol 4759	.1598 [2]
Ameripol 4760	.1576 [2]
Ameripol 4761	.1710 [2]
ASRC 1000	.2410 [2]
ASRC 1001 and 1004	.2410 [2]
ASRC 1006	.2410 [2]
ASRC 1009	.2475 [2]
ASRC 1018	.2700 [2]
ASRC 1019	.2650 [2]
ASRC 1500	.2410 [2]
ASRC 1502	.2410 [2]
ASRC 1503	.2625 [2]
ASRC 1703	.2060 [2]
ASRC 1708	.1910 [2]
ASRC 1712	.1885 [2]
ASRC 1713	.1750 [2]
ASRC 3105 and 3106	.2410 [2]
ASRC 3110	.2600 [2]
Baytown B-129	.1960 [2]
Baytown B-134	.1900 [2]
Baytown B-172	.1825 [2]
Baytown 1600	.1930 [2]
Baytown 1601	.1930 [2]
Baytown 1602	.1930 [2]
Baytown 1801	.1760 [2]
Baytown 1803	.1740 [2]
Baytown 1811	.1569 [2]
Baytown 8675	.1820 [2]
Baytown 8676	.1876 [2]
Baytown 8677	.1820 [2]
Baytown 8678	.2080 [2]
Baytown 8679	.2022 [2]
Baytown 8680	.1775 [2]
Baytown 8681	.1835 [2]
Baytown 8775	.1545 [2]
Baytown 8776	.1679 [2]
Baytown 8777	.1550 [2]
Baytown 8778	.1480 [2]
Baytown 8779	.1496 [2]
Baytown 8780	.1507 [2]
Baytown 8781	.1655 [2]
Baytown 8782	.1583 [2]
Baytown 8783	.1515 [2]
C-102 (Shell)	.2300 [2]
Carbomix 1606	.1820 [2]
Carbomix 1608	.1845 [2]
Carbomix 1609	.2080 [2]
Carbomix 1808	.1480 [2]
Carbomix 1809	.1545 [2]
Carbomix 1811	.1569 [2]
Carbomix 1813	.1640 [2]
Carbomix 1814	.1545 [2]
Carbomix 1815	.1496 [2]
Carbomix 1817	.1715 [2]
Carbomix 3761	.1576 [2]
Carbomix 3764	.1685 [2]
OB-102 (Shell)	.1850 [2]
Copo 1006	.2410 [2]
Copo 1500	.2410 [2]
Copo 1502	.2410 [2]
Copo 1505-NS	.2610 [2]
Copo 1507	.2410 [2]
Copo 1510	.2410 [2]
Copo 1512	.1885 [2]
Copo 1713	.1750 [2]
Copo 1714	.1725 [2]
Copo 1773	.2060 [2]
Copo 1778	.1910 [2]
FR-S 146	.2410 [2]
FR-S 158	.3000 [2]
FR-S 173	.2060 [2]
FR-S 178	.1910 [2]
FR-S 181 and 182	.2410 [2]
FR-S 184	.1885 [2]
FR-S 1000	.2410 [2]
FR-S 1001	.1410 [2]
FR-S 1004 and 1006	.2410 [2]
FR-S 1007	.2410 [2]
FR-S 1009	.2475 [2]
FR-S 1010	.2600 [2]
FR-S 1012	.2425 [2]
FR-S 1013	.2410 [2]
FR-S 1014	.2810 [2]
FR-S 1500 and 1502	.2410 [2]
FR-S 1703	.2060 [2]
FR-S 1710 and 1712	.1885 [2]
Gentro 1500	.2410 [2]
Gentro 1712	.1885 [2]
Gentro-Jet 9152	.2080 [2]
Gentro-Jet 9153	.1820 [2]
Gentro-Jet 9154	.1845 [2]
Gentro-Jet 9250	.1580 [2]
Gentro-Jet 9251	.1640 [2]
Gentro-Jet 9252	.1670 [2]
Gentro-Jet 9275	.1500 [2]
Naugapol 1015	.3500 [2]
Naugapol 1016	.2650 [2]
Naugapol 1018	.2700 [2]
Naugapol 1019	.2650 [2]
Naugapol 1022	.3050 [2]
Naugapol 1023	.3300 [2]
Naugapol 1503	.2625 [2]
Naugapol 1504	.3500 [2]
Naugapol 6003	.2700 [2]
Naugapol 6100	.3200 [2]
OB-102 (Shell)	.1825 [2]
OB-104 (Shell)	.1475 [2]
OB-106 (Shell)	.1510 [2]
OB-110 (Shell)	.1410 [2]
OB-111 (Shell)	.1540 [2]
OB-113C (Shell)	.1750 [2]
OB-114C (Shell)	.1420 [2]
OB-116 (Shell)	.1810 [2]
Philprene 1000	.2410 [1]
Philprene 1006	.2410 [1]
Philprene 1009	.2475 [1]
Philprene 1018	.2700 [1]
Philprene 1019	.2650 [1]
Philprene 1500 and 1502	.2410 [2]
Philprene 1503	.2625 [1]
Philprene 1601	.1930 [1]
Philprene 1603	.1960 [1]
Philprene 1605	.1900 [1]
Philprene 1606	.1820 [1]
Philprene 1608	.1845 [1]
Philprene 1609	.2080 [1]
Philprene 1703	.2060 [1]
Philprene 1708	.1910 [1]
Philprene 1712	.1885 [1]
Philprene 1803	.1740 [1]
Philprene 1805	.1550 [1]
Philprene 1808	.1480 [1]
Plioflex 1006	.2410 [2]
Plioflex 1500C	.2410 [2]
Plioflex 1502	.2410 [2]
Plioflex 1507	.2410 [2]
Plioflex 1508	.2410 [2]
Plioflex 1510	.2410 [2]
Plioflex 1710C and 1712C	.1885 [2]
Plioflex 1713	.1750 [2]
Plioflex 1714C	.1725 [2]
Plioflex 1773	.2060 [2]
Plioflex 1778	.1910 [2]
Polysar Kryflex 200	.2510 [2]
Polysar Krylene	.2410 [2]
Polysar Krylene NS	.2410 [2]
Polysar Krynol 651	.1885 [2]
Polysar Krynol 652	.1910 [2]
Polysar S-630	.2410 [2]
Polysar S-X 371	.2550 [2]
Polysar SS-250	.2875 [2]
S-1000	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1009	.2400 [2]
S-1011	.2325 [2]
S-1013	.2300 [2]
S-1500	.2300 [2]
S-1502	.2300 [2]
S-1509	.2300 [2]
S-1600	.1825 [2]
S-1602	.1825 [2]
S-1604	.1825 [2]
S-1605	.1800 [2]
S-1606	.1750 [2]
S-1607	.1750 [2]
S-1703	.1950 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1710	.1775 [2]
S-1712	.1775 [2]
S-1778	.1800 [2]
S-1800	.1475 [2]
S-1802	.1410 [2]
S-1803	.1650 [2]
S-1804	.1750 [2]
S-1806	.1510 [2]
S-1807	.1540 [2]
S-1808	.1420 [2]
S-7652	.1875 [2]
S-7701	.1850 [2]
SP 103 (Shell)	.2900 [2]
Synpol 1000 and 1001	.2410 [2]
Synpol 1002	.2435 [2]
Synpol 1006	.2410 [2]
Synpol 1007	.2410 [2]
Synpol 1009	.2475 [2]
Synpol 1012	.2425 [2]
Synpol 1013	.2410 [2]
Synpol 1061	.2410 [2]
Synpol 1500	.2410 [2]
Synpol 1502	.2410 [2]
Synpol 1551	.2410 [2]
Synpol 1703	.2060 [2]
Synpol 1707	.1910 [2]
Synpol 1708	.1910 [2]
Synpol 1712	.1885 [2]
Synpol 8103	.2401 [2]
Synpol 8151	.1820 [2]
Synpol 8152	.1860 [2]
Synpol 8200	.1910 [2]
Synpol 8201	.1750 [2]
Synpol 8202	.1725 [2]
Synpol 8208	.1750 [2]
Synpol 8255	.1480 [2]
Synpol 8253	.1584 [2]
Synpol 8254	.1545 [2]
Synpol 8266	.1598 [2]
Synpol 8267	.1640 [2]

Butyl Rubbers

Enjay Butyl 035 and 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [2]
Enjay Butyl 217	.2300 [2]
Enjay Butyl 218	.2300 [2]
Enjay Butyl 268 NS	.2400 [2]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl 100	.2450 [2]
Polysar Butyl 101	.2775 [2]
Polysar Butyl 200 and 300	.2450 [2]
Polysar Butyl 301	.2550 [2]
Polysar Butyl 400	.2450 [2]

SYNTHETIC RUBBER POLYMERS

Chlorosulfonated Polyethylene

Hypalon 20	.4700 [3]
Hypalon 30	.6000 [3]
Hypalon 40	.5000 [3]

Fluoroelastomers

Fluorel	$10.25 [3]
Kel-F 3700 and 5500	$16.00 [3]
Viton A and A-HV	$10.00 [3]
Viton B	$13.00 [3]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [3]
Neoprene Type AD	.5500 [3]
Neoprene Type FB	.6500 [3]
Neoprene Type GN	.4100 [3]
Neoprene Type GN-A	.4100 [3]
Neoprene Type GRT	.4200 [3]
Neoprene Type KNR	.7500 [3]
Neoprene Type S	.4200 [3]
Neoprene Type W	.3900 [3]
Neoprene Type WB	.4100 [3]
Neoprene Type WHV	.3900 [3]
Neoprene Type WRT	.4500 [3]
Neoprene Type WX	.4100 [3]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.5000 [3]
Thiokol Type FA	.6900 [3]
Thiokol Type ST	1.2500 [3]

Silicone Rubbers*

	(prices l.c.l.)
GE (compounded)	2.50 [3]
GE Silicone Gum (not compounded)	4.00 [3]
Silastic (compounded)	2.50 [3]
Silastic (gums)	4.00 [3]
Union Carbide (gums)	4.00 [3]
Union Carbide (compounds)	2.50 [3]

Latex

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400 and N-401	.5400 [1]
Chemigum 200	.4800 [3]
Chemigum 235	.5300 [3]
Chemigum 236	.5300 [3]
Chemigum 245	.4500 [3]
Chemigum 246	.4500 [3]
Chemigum 247	.4500 [3]
Chemigum 248	.4500 [3]
Hycar 1512	.4500 [3]
Hycar 1551	.5300 [3]
Hycar 1552	.4500 [3]
Hycar 1561	.5300 [3]
Hycar 1562	.4500 [3]
Hycar 1571	.5300 [3]
Hycar 1572	.4500 [3]
Hycar 1577	.4500 [3]
Nitrex 2612	.4500 [1]
Nitrex 2616	.5300 [1]
Nitrex 2620	.4500 [1]
Nitrex 2625	.4500 [1]
Tylac 640 and 650	.4500 [1]
Tylac 750	.4900 [1]
Tylac 850	.5300 [1]
Tylac 1640 and 1650	.5400 [1]

Butadiene-Styrene Types

CL-101 (Shell)	.2800 [3]
Copo 2000	.2775 [3]
Copo 2101	.3000 [3]
Copo 2102	.3200 [3]
Copo 2105	.3200 [3]
Copo 2108	.3000 [3]
Copo 2109	.2775 [3]
Copo 2110	.3200 [3]
Copo 3852	.3000 [3]
FR-S 110	.3000 [3]
FR-S 150	.3000 [3]
FR-S 151	.2900 [3]
FR-S 174	.2950 [3]
FR-S 176	.2775 [3]
FR-S 2000	.2775 [3]
FR-S 2001	.2775 [3]
FR-S 2002	.3000 [3]
FR-S 2003	.3050 [3]
FR-S 2004	.3050 [3]
FR-S 2006	.2900 [3]
FR-S 2105	.3200 [3]
Naugatex 2000 and 2001	.2750 [1]
Naugatex 2002	.3000 [1]
Naugatex 2006	.2900 [1]
Naugatex 2105 and 2107	.3200 [1]
Naugatex 2108	.3000 [1]
Naugatex 2113	.2900 [1]
Naugatex J-8174-F	.3200 [1]
Naugatex J-8855	.3000 [1]
Naugatex J-9049	.2750 [1]
Naugatex J-9064	.3050 [1]
Pliolite 2000	.2775 [3]
Pliolite 2001	.2775 [3]
Pliolite 2076	.2900 [3]
Pliolite 2104	.3200 [3]
Pliolite 2105	.3200 [3]
Pliolite 2107	.3200 [3]
Pliolite 2108	.3000 [3]
S-2000 and S-2006	.2600 [3]
S-2101	.2600 [3]
S-2105	.2800 [3]
S-2108	.2900 [3]
Tylac 400	.3000 [3]
Tylac 410 and 420	.2900 [1]
Tylac 450-A	.2750 [3]
Tylac 3040 and 3340	.3200 [1]

Neoprene

Neoprene Latex 60	.4000 [3]
Neoprene Latex 571	.3700 [3]
Neoprene Latex 572	.3900 [3]
Neoprene Latex 601-A	.4000 [3]
Neoprene Latex 673	.5000 [3]
Neoprene Latex 735	.3800 [3]
Neoprene Latex 736	.3800 [3]
Neoprene Latex 842-A	.3700 [3]
Neoprene Latex 950	.4700 [3]

Polysulfide Rubbers

Thiokol Type MX	.8000 [3]
Thiokol Type WD-2	1.2500 [3]
Thiokol Type WD-6	.8000 [3]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid. *Covers a wide range of compounds. Readers are urged to check specific prices with producers.

Suppliers are your Materials Listed in the Market Prices Section?
If not, forward full information to —
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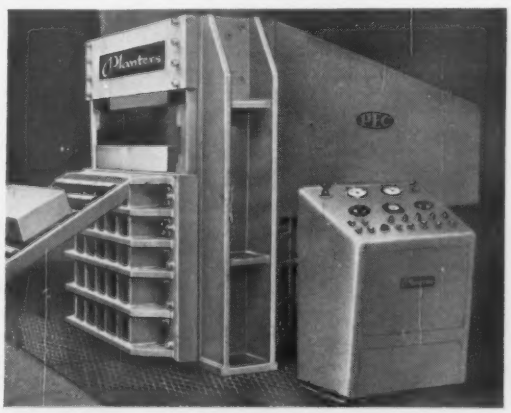

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MARKETS

(continued)

Reclaimed Rubber

In consideration of the generally lower consumption of rubber in 1960, the reclaimed rubber segment did not do too badly. The Rubber Manufacturers Association reports that a total of 278,894 long tons of reclaimed rubber were consumed in the United States in 1960, approximately 12,000 long tons less than in the previous year.

During 1960, 293,643 long tons of reclaimed rubber were produced compared with the 304,145 long tons produced during the preceding year. At the end of 1960, there were 32,733 long tons of reclaim in stocks on hand, about 3,000 long tons more than were available as of December 31, 1959.

It is generally expected that 1961 will be slightly better for the reclaiming industry. Reclaim usage in 1960 represented 17.9 per cent of the total rubber consumed. It is not unlikely that 1961 will see this figure go over the 18 per cent mark.

(Prices for All Areas Except West Coast)
(Average price, carload quantities, minimum freight allowed)

	per lb.
First Line Whole Tire	.11½
First Line Whole Tire Stainless	.12¼
Second Line Whole Tire	.11
Third Line Whole Tire	.10¾
Fourth Line Whole Tire	.10¼
Black Carcass	.15¼
Peelings	.11½
Butyl Tube	.16
Natural Rubber Black Tube	.17
Natural Rubber Red Tube	.21
Mechanical, Light Color, Low Gravity	.26
Mechanical, Light Color, Medium Gravity	.20

Scrap Rubber

Snow and freezing temperatures apparently have had little effect on the scrap rubber market during the past few weeks. The trade has classified business as being "moderate." Generally speaking, the market has been featureless and there has not been any major price moves, either up or down.

The Rubber Manufacturers Association reports that a total of 265,700 long tons of scrap rubber were consumed in the United States in 1960, not too far off what had been expected earlier in that year. Indications are that the scrap rubber market will continue its featureless pace, at least for the first few months of 1961.

(Prices Delivered Akron)

Mixed tires	ton	14.00
Light colored carcass	lb.	.05¾
No. 1 peelings	ton	40.00
No. 2 peelings	ton	28.00
No. 3 peelings	ton	23.00
Buffings	ton	16.00
Truck and Bus S.A.G.	ton	22.00
Passenger S.A.G.	ton	20.00
Natural Rubber Red Tubes	lb.	.07½
Natural Rubber Black Tubes	lb.	.07
Butyl Rubber Tubes	lb.	.06½

Tire Fabrics

From Here and There: Industrial Rayon Corp. has announced that it will begin commercial production soon of a new and "significantly stronger" Tyrex tire cord. The new product is said to be particularly well-suited for heavy duty tires. It is rated at 10 per cent stronger than present cord and has other substantially improved characteristics which will enable the manufacture of Tyrex cord tires with greatly increased resistance to impact failure and fatigue, the company states.

Tests conducted by Goodall Rubber indicate that oriented nylon 6 sheeting promises extra-long life for conveyor belting. According to the company, tests have shown that nylon 6 belting may outlast conventional belting by as much as 100 per cent in heavy-duty applications.

The nylon 6 used by Goodall is a special grade supplied by Spencer Chemical. Spencer sees use of its new material as opening up a big new outlet for nylon 6 resin. Advantages of the new belting are said to include high flex strength, less down-time and lower maintenance.

First use of the new belting material will be in belts intended for extremely severe service, Goodall states. A good example is belts for mucking machines used in tunnel construction.

Hans J. Zimmer A. G. für Industrienlagenbau of Frankfurt/Main, West Germany, recently announced that it has obtained a contract to build a nylon tire cord plant in Czechoslovakia, to cost $2,800,000.

The Zimmer company was formed a few months ago as a joint venture of Vickers, Ltd. of London and Hans J. Zimmer Verfahrenstechnik of Frankfurt. The capacity of the new plant, and its expected date of operation, were not made known. Machinery and equipment for the installation will be made by Vickers.

As part of an economic development plan, the Republic of Korea recently submitted to the U. S. State Department a request to build four rayon plants with an aggregate capacity of 15,000 metric tons per year. Capital investment from the U. S. is sought in the amount of $36 million over the next four years. If these projects are approved, it is calculated that Korea would not have to import rayon after 1967.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.55
1650	lb.	.49
2200	lb.	.48

Nylon Tire Cord

840	lb.	.92
1680	lb.	.92

Rayon Graded Fabric

1100	lb.	.69
1650	lb.	.63½
2200	lb.	.63

Cotton Chafers

8.9 oz. (per square yard)	lb.	.71
9.25 oz. (per square yard)	lb.	.72
11.65 oz. (per square yard)	lb.	.66
14.4 oz. (per square yard)	lb.	.75

Liquid Latex

Natural: The importation and consumption of natural rubber latex in the United States during 1960 dropped appreciably from the 1959 figures. During 1960, a total of 48,858 long tons of natural rubber latex were imported into the United States compared with the 79,206 long tons which reached the United States in 1959.

In 1960, 50,810 long tons of natural latex were consumed in the United States against the 71,745 long tons consumed in the previous year. As of December 31, 1960, there were 9,150 long tons of natural latex in stocks on hand, about 3,000 long tons less than were in stocks on December 31, 1959.

It is agreed that perhaps the major reason for the decline in U. S. consumption of natural rubber latex in 1960 is the matter of price. For most of the year, natural latex prices were above a 40c level, and this is the point at which resistance to purchase is historically evident.

Natural latex enters the new year enjoying relatively lower prices, at a 35-36c level at East Coast ports in car load lots. At these price levels, it may be that consumption will show some upward movement.

Synthetic: Operating within a stable price structure, there is every evidence that synthetic latices will fare as well, if not better, in 1961 as they did in 1960. SBR latices, in particular, should continue to do well. At the moment, there is no trade talk about prices which seem reasonably sure to remain at current levels for the next several months.

Cotton

The price of middling uplands on the New York Cotton Exchange remained absolutely stable all during the month of January with a price of 32.25c being quoted each day. The average price compared with 31.60c in December, 1960.

While the market remains in the doldrums, the trade is awaiting the new administration's decision as to parity prices. The head of the American Farm Bureau Federation has recommended that price supports for cotton be set between 70 to 75 per cent of parity.

The president of the American Cotton Producers Association maintains that cotton producers would be unable to take a price support lower than the 75 per cent set last year for choice "A" cotton. Meanwhile, a bill to peg cotton price supports for the 1961 crop at 75 per cent of parity has already been introduced in Congress. The measure would also postpone until 1962 any change in the price support base.

The present law would let the Secretary of Agriculture set the price support for 1961 cotton at as little as 70 per cent of parity, and require him to shift the price support base from middling ⅞-inch cotton to "average of the crop" cotton.

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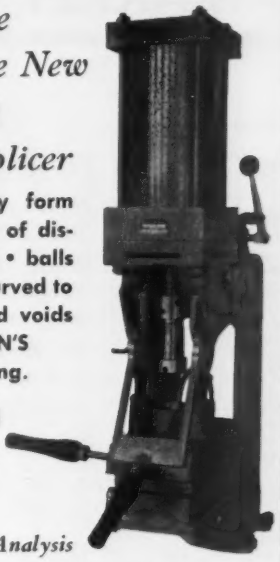

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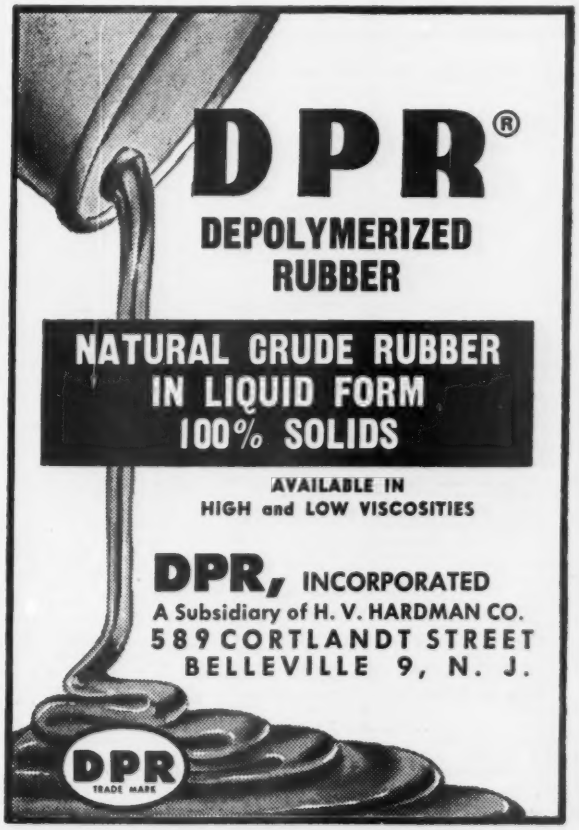

DPR®

DEPOLYMERIZED RUBBER

NATURAL CRUDE RUBBER IN LIQUID FORM 100% SOLIDS

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DPR TRADE MARK

MARKET PRICES

FEBRUARY 1, 1961

Prices are, in general, f.o.b. works and cover the domestic markets only. Export prices, as a rule, are usually slightly higher, due to packing regulations, special handling, etc.

Abbreviations: bbls., barrels; c.l., carload; cyl., cylinder; dlvd., delivered; dms., drums; eqld., equalized; l.c.l., less than carload; M.B. masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

*Trademark. †For Export Only.

The arrangement of this section closely follows the Chemical Section of the 1961 RUBBER RED BOOK. Readers are referred to that edition for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)*	lb.	.74	.81
A-32*	lb.	.66	.80
A-100*	lb.	.52	.66
Accelerator No. 8*	lb.	—	1.25
Accelerator—49*	lb.	.60	.61
Accelerator 108*	lb.	—	.92
Accelerator—552*	lb.	—	2.25
Accelerator—808*	lb.	.66	.68
Accelerator—833*	lb.	1.17	1.19
Accelerator B*	lb.	—	.92
Altax*	lb.	.54	.56
Amax*	lb.	.75	.77
No. 1*	lb.	.71	.73
Ancap*(†)	lb.	.38	.40
Ancatax*(†)	lb.	.48	.50
Ancazate BU (ET & ME)*(†)	lb.	—	1.07
Ancazide ET*(†)	lb.	—	1.07
ME*(†)	lb.	—	1.14
Arazate*	lb.	—	2.25
Arquad 12*	lb.	.55	.61
Beutene*	lb.	.66	.68
Bismate, Rodform*	lb.	—	3.00
Butazate 50D*	lb.	.87	.89
Butyl Eight*	lb.	1.10	1.35
Butyl Namate	lb.	.45	.50
Captax*	lb.	.44	.46
C-P-B*	lb.	—	1.95
Cumate, Rodform*	lb.	—	1.45
Cydac*	lb.	.71	.73
Delac S*	lb.	.71	.73
DIBS*	lb.	—	.85
Diorthotolyguanidine	lb.	.69	.70
Dipac*	lb.	—	.85
Diphenylguanidine	lb.	.51	.52
Dithiocarbamates			
Cyzate B & E	lb.	.85	.89
El-Sixty*	lb.	.62	.69
Ethazate*	lb.	—	1.04
50D*	lb.	.87	.89
Ethyl Thiurad*	lb.	—	1.04
Ethyl Tuex*	lb.	—	1.04
Ethylac*	lb.	.93	.95
Geigy Amines	lb.	.46	.52
Guantal*	lb.	.62	.69
Hepteen Base*	lb.	—	1.85
Kure-Blend MT*	lb.	—	.70
Ledate, Rodform*	lb.	—	1.04
MBT-XXX*	lb.	.55	.57
MBTS Grains*	lb.	.54	.56
Merac*	lb.	.75	1.05
Mercaptobenzothiazol	lb.	.44	.46
Mercaptobenzothiazyl Disulfide	lb.	.54	.56
Mertax*	lb.	.55	.62
Methazate*	lb.	—	1.04
Monex*	lb.	—	1.14
Mono Thiurad*	lb.	—	1.14
2-MT	lb.	.88	.90
NA-22* (for neoprene)	lb.	—	1.05
NOBS No. 1*	lb.	.71	.73
Special*	lb.	.75	.77
O-X-A-F	lb.	.55	.57
Pennac SDB*	lb.	.45	.48
Pentex*	lb.	—	1.24
Flour*	lb.	—	.30
Permalux (Neoprene)*	lb.	—	2.25
Phenex*	lb.	.60	.65
Polyac*	lb.	—	1.85
R-2 Crystals*	lb.	—	4.55
Rotax*	lb.	.50	.52
RZ-50-A* and B*	lb.	.70	1.00
Santocure*; NS*	lb.	.71	.73
26*	lb.	.75	.77
Selenac* (Ethyl, Methyl)	lb.	—	3.00
Seleram, Ethyl	lb.	—	3.00
Setsit-5*	lb.	.75	1.05
9*	lb.	.85	1.15
SPDX-GH*	lb.	.77	.79
GL*	lb.	1.20	1.30
Tellurac*	lb.	—	1.75
Tellurac Rodform (80%)	lb.	—	1.40
Tepidone*	lb.	.45	.45
Tetrone A*	lb.	—	1.98
Thiate A*	lb.	.88	—
B*	lb.	1.05	1.25
Thiazole ZMBT	lb.	.55	.57
Thiofide*	lb.	.54	.61
Thionex*	lb.	—	1.14
Thiotax*	lb.	.44	.51
Thiram, Ethyl	lb.	—	1.04
Methyl	lb.	—	1.14
Thiurad*	lb.	—	1.14
Thiuram E*	lb.	—	1.04
M*	lb.	—	1.14
Cyuram DS & MS	lb.	1.14	1.14
Trimene*	lb.	.56	.58
Base*	lb.	1.03	1.06
Triphenyl Guanidine	lb.	—	.90
Tuads* (Ethyl)	lb.	—	1.04
Tuads* (Methyl)	lb.	—	1.14
Tuex*	lb.	—	1.14
Ultex*	lb.	1.15	1.20
Unads*	lb.	—	1.14
Vulcacure NB*	lb.	.45	.45
NS*	lb.	.75	1.05
TMD*	lb.	—	1.14
ZB*, ZE*, ZM*	lb.	.85	.89
Z-B-X*	lb.	—	2.45
Zenite*	lb.	.54	.56
Zenite A*	lb.	.69	.71
Zenite AM*	lb.	.76	.78
Zenite Special*	lb.	.55	.57
Zetax* (uncoated)	lb.	.55	.57
Zimate* (Butyl)	lb.	—	1.04
Zimate* (Ethyl)	lb.	—	1.04
Zimate* (Methyl)	lb.	—	1.04
Zimate Slurry 50% solids content (Butyl, Ethyl & Methyl)	lb.	.85	.89
Ziram, Butyl	lb.	—	1.04
50% Dispersion	lb.	.85	.89
Ziram, Ethyl	lb.	—	1.04
50% Dispersion	lb.	.85	.89
Ziram, Methyl	lb.	—	1.04
50% Dispersion	lb.	.85	.89

ACTIVATORS

Blue Lead Sublimed	lb.	.17	.18
Cottonseed Fatty Acids			
Drew Wecoline C*	lb.	.17¾	.19
Wochem 210* and 211*	lb.	.14¾	.17¼
Fish Oil, Hydrogenated, Fatty Acid			
Century Hydrex 440	lb.	.11½	.14
DAR-S*	lb.	.10	.12½
DAR-HY*	lb.	.14½	.17
Groco 56*	lb.	.10	.12½
Hydrofol Acids*	lb.	.11½	.20½
Hyfac 430*	lb.	.17	.19½
Neo-Fat H.F.O.*	lb.	.14½	.15¾
Neutrex*	lb.	.13¾	.16¼
Stearite*	lb.	.11¾	.14¼
Talene*	lb.	.16¼	.18¾
Wecoline 200*	lb.	.14¾	.16
1000*, 1500*	lb.	.12	.13¼
Wochem 730*	lb.	.10	.12½
731*	lb.	.14¼	.17
732*	lb.	.15¼	.18
Lime, Hydrated			
Arrowhead*	ton	—	21.00
Marblehead*	ton	—	19.25
Sierra*	ton	—	22.50
Litharge			
Eagle-Pitcher* (c.l.)	lb.	.13¾	—
National Lead*	lb.	—	.13¾
SB*	lb.	—	.18½

ACTIVATORS (Cont'd)

Magnesium Oxide, Heavy			
DCI 601*	lb.	.25¼	—
General Magnesite 500*	lb.	.05½	.06
600*	lb.	.06½	.07
Kaiser 325*	lb.	.03½	.06½
Michigan No. 15*	lb.	.05½	.06½
Morton's Magnesia	lb.	.25¼	—
Magnesium Oxide, Light			
Carey Mag*	lb.	.25¼	.26
DCI Technical*	lb.	.21½	.23½
General Magnesite* (neoprene grade)	lb.	.26¾	.28¾
General Magnesite No. 101*	lb.	.24¾	.27¼
Genmeg MLW*	lb.	.25¼	.27¾
Light Calcined Magnesia			
No. X-01*	lb.	.25¼	.26
Maglite D*	lb.	.25¼	—
K*	lb.	.25¾	.27
L*	lb.	.29¾	.30¾
M*	lb.	.27	.28½
Seamag*	lb.	.20	.20½
Marmag*	lb.	.24¾	.26
Michigan No. 30*	lb.	.24¼	.26½
Michigan 1782 Magnesia*	lb.	.25¼	.26½
Neomag Powder*	lb.	.29¼	.30
Pellets*	lb.	.31¼	.32
Oleic Acid			
Dar-Chem* 105	lb.	.16½	.19
Drew Wecoline OO*	lb.	.17¾	.19
Emersold 210*	lb.	.16½	.19
Groco Red Oil	lb.	.16½	.19
Neo-Fat 92-04*	lb.	.20½	.22½
94-04*	lb.	.18½	.20½
Wochem 310, 311	lb.	.16½	.19
Palm Fatty Acids			
Groco 45*	lb.	.14¾	.17¼
Neo-Fat*	lb.	.15¾	.17¾
Wochem 280*	lb.	.15	.17½
281*	lb.	.15½	.18
Potassium Oleate (dms.)	lb.	.48	.73
Drew 24%*	lb.	.20	.73
Red Lead			
Eagle-Picher* (c.l.)	lb.	.14¼	—
National Lead*	lb.	.14¼	.14¾
No. 2 RM*	lb.	—	.18½
Sodium Laurate, 75%	lb.	.64	.89
Sodium Oleate, 75%	lb.	.54	.79
Paste (dms.)	lb.	.39	.64
Sodium Stearate, 75%	lb.	.47	.72
Stearic Acid, Single Pressed			
Century 1210*	lb.	.15¼	.17¾
Dar-Chem 11*	lb.	.15¼	.17¼
Emersol 110*	lb.	.15¼	.17¾
Neo-Fat 18-53*	lb.	.14¾	.16¾
Stearic Acid, Double Pressed			
Century 1220*	lb.	.15¾	.18¼
Dar-Chem 12*	lb.	.15¾	.18¼
Emersol 120*	lb.	.15¾	.18¼
Groco 54*	lb.	.15¾	.18¼
Neo-Fat 18-54*	lb.	.15¼	.17¾
Stearic Acid, Other			
Century 1230*	lb.	.17½	.20
1240-Supra*	lb.	.17½	.20
Extra Pearlstearic*	lb.	.17½	.20
Neo-Fat 18*	lb.	.18½	.20½
18-58*	lb.	.14¼	.16¼
18-61*	lb.	.16¼	.18¼
Stearex*	lb.	.11¾	.13
Stearite*	lb.	.11¼	.13¼
Wecoline 300*	lb.	.15¼	.16½
Wochem 720*	lb.	.10¼	.12¾
721*	lb.	.10¼	.12¾
White Lead Basic Carbonate	lb.	.18	.19
White Lead Basic Sulfate	lb.	.17	.18
Zinc Laurate			
Laurex*	lb.	.37	.39
Zinc Stearate	lb.	.41	.46
Aquazinc K.C.*	lb.	.30	.55
Crown Brand*	lb.	.39	.44

Unclassified Activators

Aktone*	lb.	.21¼	.23¼
Barak*	lb.	—	.65
Curade*	lb.	.57	.59
DCI Magnesium Carbonate*	lb.	.11	—
Dibenzo G-M-F	lb.	—	2.60
D-B-A*	lb.	—	1.95
G-M-F*	lb.	—	2.60
Dibutylamine (dlvd.)	lb.	.55½	.56½
MODX*	lb.	.38	.40
Neo Fat 42-07*	lb.	.10¼	.12¼
Ridacto* (dms.)	lb.	.25	.26
Snodotte* (dlvd.)	lb.	.18½	.21
Vimbra	lb.	.32	.38½
Vulklor*	lb.	.88	.98

ANTI-COAGULANTS

Aqua Ammonia* (dms.)	lb.	.031	.035
M.B.M.C.* (l.c.l.)	lb.	.54	.76

ANTI-FOAMING AGENTS

Aero Anti Foam H*	lb.	——	-	.20
Regular*	lb.	——	-	.12
Anhydrol 6991*	lb.	.51	-	.56
D.C. Antifoam A*	lb.	4.85	-	5.95
Antifoam A Emulsion*	lb.	1.78	-	2.58
Antifoam AF Emulsion*	lb.	1.78	-	2.58
Antifoam B*	lb.	.59	-	1.06
Detoama W-1701*	lb.	——	-	.12½
Defoamer A-25*	lb.	——	-	3.00
Detoamer 630*	lb.	——	-	.14
Deltyl Prime	lb.	.70	-	.80
Foamnix*	lb.	.60	-	1.50
G-E Antifoam SS-24*; 66*	lb.	5.28	-	6.65
60 Emulsion*	lb.	2.05	-	3.75
Igepol CO-210	lb.	——	-	.36
Kessco X-3* (dms.)	lb.	——	-	.39
X-180*	lb.	——	-	.28
X-181*	lb.	——	-	.36½
Nopco 1407*	lb.	.20½	-	.22½
1497-V*	lb.	.15¼	-	.17¼
1907-B*	lb.	.22½	-	.25
JMK*	lb.	.48½	-	.51
JMU*	lb.	.23¼	-	.25¾
JMY*	lb.	.23¼	-	.23½
NDW*	lb.	.21½	-	.24
Pluronic L61*	lb.	.33½	-	.39
RS-968*	lb.	.38	-	.38½
Terpinol Prime No. 1	lb.	.35	-	.50
Tributyl Phosphate (dms.)	lb.	.52½	-	.53½
UC SAG 47*	lb.	4.85	-	6.25
470*	lb.	.61	-	1.10
VL-520*	lb.	2.68	-	3.50

ANTIOXIDANTS

Agebest 1293-22A*	lb.	1.90	-	2.00
AgeRite Alba*	lb.	2.40	-	2.50
DPPD*	lb.	1.12	-	1.14
Gel*	lb.	.70	-	.72
Hipar*	lb.	1.05	-	1.07
H.P.*	lb.	.79	-	.81
ISO*	lb.	1.82	-	1.84
Powder*	lb.	.57	-	.59
Resin*	lb.	.88	-	.90
Resin D*	lb.	.57	-	.59
Spar*	lb.	.57	-	.59
Stalite & Stalite S*	lb.	.57	-	.59
Superflex*	lb.	.57	-	.59
Superlite*	lb.	.57	-	.59
White*	lb.	1.50	-	1.60
Akroflex C* Pellets	lb.	.85	-	.87
CD*	lb.	.79	-	.81
Aminox*	lb.	.57	-	.59
Antioxidant 425*	lb.	2.47	-	2.50
Antioxidant 2246*	lb.	1.50	-	1.53
Antox*	lb.	.59	-	.61
Aranox*	lb.	——	-	3.25
Betanox Special*	lb.	.94	-	.96
B-L-E*	lb.	.57	-	.59
Catalin CAO No. 1*	lb.	.57	-	.60
CAO No. 3*	lb.	.65	-	.68
CAO No. 5*	lb.	1.49	-	1.50
CAO No. 6*	lb.	——	-	3.50
Dalpac 4	lb.	.57	-	.60
Deenax*	lb.	.57	-	.60
Diphenylamine	lb.	.31	-	.33
Di-tert-Butyl-para-Cresol*	lb.	.86	-	1.16
DBPC*	lb.	.54	-	.60
Eugenol C-95%*	lb.	2.30	-	2.50
Flectol H*	lb.	.57	-	.64
Flexamine*	lb.	.79	-	.81
Ionol*	lb.	.57	-	.60
Naugawhite*	lb.	.57	-	.59
Powder*	lb.	.57	-	.59
Neozone A*	lb.	.64	-	.66
C*	lb.	.86	-	.88
D*	lb.	.57	-	.59
Nevastain A*	lb.	.51	-	.61
B*	lb.	.51	-	.70
Nullapon BF-12*	lb.	——	-	.21½
BF-13*	lb.	——	-	.25½
BF-78*	lb.	——	-	.55
BF-Acid*	lb.	——	-	.85
Octamine*	lb.	.57	-	.59
Oxidex*	lb.	——	-	3.60
PDA-10*	lb.	.46	-	.48
Pennox* A, B, C, D	lb.	.57	-	.72
Permalux*	lb.	——	-	2.25
Polygard*	lb.	.57	-	.59
Santoflex AW*	lb.	.71	-	.78
DD*	lb.	.57	-	.64
75*	lb.	1.01	-	1.08
Santovar-A*	lb.	1.55	-	1.62
Santowhite Crystals*	lb.	1.55	-	1.62
Santowhite L*	lb.	.57	-	.64
MK*	lb.	1.25	-	1.32
Powder*	lb.	1.55	-	1.62
Sequestrene AA*	lb.	.70	-	.80
NA2*	lb.	.59	-	.66
NA3T*	lb.	.54	-	.61
Sodium Nitrate	cwt.	8.75	-	11.00
Stabilite*	lb.	.57	-	.59
Alba*	lb.	.75	-	.80
FLX*	lb.	.78	-	.80
L*	lb.	.65	-	.67
White*	lb.	.57	-	.59
White Powder*	lb.	.46	-	.48
Stabilizer No. 1*	lb.	1.55	-	1.80
Stabilizer No. 9-A*	lb.	.80	-	1.05
Styphen I*	lb.	.51	-	.55
Sunolite*	lb.	.16	-	.22
Tecquinol*	lb.	.82½	-	.84½
Tenamene 3*	lb.	.57	-	.60
Thermoflex A*	lb.	1.05	-	1.07
Wing-Stay S*; T*	lb.	.56	-	.67
Zalba*	lb.	——	-	1.10
Special*	lb.	——	-	.85

ANTIOZONANTS

Eastozone*; 32*	lb.	1.15	-	1.18
Flexzone 3C	lb.	——	-	2.00
6-H	lb.	1.25	-	1.27
Fura-Tone NC-1008*	lb.	.28	-	.39
NC-1012*	lb.	.46	-	.69
Santoflex AW*	lb.	.71	-	.78
UOP 88* & 288* (dms.)	lb.	1.05	-	1.07
Wing-Stay 100*	lb.	1.00	-	1.08

ANTI-SCORCHING AGENTS

Akron Benzoic Acid	lb.	.41	-	.43
Armeen HT*	lb.	.34	-	.40
Good-rite Vultrol*	lb.	.67	-	.70
Harcopol 1183*	lb.	.70	-	.74
Retarder PD*	lb.	.37	-	.39
W*	lb.	——	-	.46
Sodium Acetate 60-62% Crystals	lb.	.08	-	.08½

ANTISEPTICS AND GERMICIDES

A.P.C. 6901*	lb.	.32	-	.38
Arquad S*	lb.	.38	-	.44
Formaldehyde (dms.)	lb.	.06	-	.076
G-4* (bbls.)	lb.	1.09	-	1.29
G-11*	lb.	1.98	-	2.08
Halane*	lb.	.40	-	.47
Irgason BS200*	lb.	2.50	-	2.75
Ortho Cresol (26°—27°)	lb.	.15	-	.16
Preventol GD	lb.	——	-	1.09
Retarder D*	lb.	.42	-	.50

ANTI-WEBBING AGENTS (for Latex)

DC 7 Compound*	lb.	4.70	-	5.80
Webnix 34-L*	lb.	1.25	-	1.75
57*; 69C*	lb.	1.50	-	2.00
71*	lb.	1.25	-	1.75

AROMATICS (DEODORANTS)

Airkem 115*	gal.	——	-	6.50
122*; 186*	gal.	——	-	6.50
Alamask AA*	lb.	——	-	3.00
AF*	lb.	——	-	2.50
AO*	lb.	——	-	1.50
AR*	lb.	——	-	.50
BG*	lb.	——	-	1.15
BGM*	lb.	——	-	.60
CY*	lb.	——	-	2.40
DJ*	lb.	——	-	3.35
DL*	lb.	——	-	1.95
H*	lb.	——	-	5.50
LD*	lb.	——	-	.75
ND*	lb.	——	-	2.75
O*	lb.	——	-	6.50
OS*	lb.	——	-	5.25
Bouquet 149*	lb.	——	-	3.00
Coumarin*	lb.	——	-	3.70
Deodorant 65*	lb.	——	-	1.85
Deodorant L-37*	lb.	2.15	-	2.25
L-44*	lb.	2.65	-	2.75
N.L.T.X.*	lb.	1.90	-	2.00
Deodorant Oil GD 6422*	lb.	1.90	-	2.20
GD 6423*	lb.	1.60	-	1.90
GD 6575*	lb.	2.40	-	2.90
GD 31063*	lb.	2.25	-	2.75
Ethavan*	lb.	6.20	-	6.25
Latex Perfume 17326	lb.	——	-	4.00
18301	lb.	——	-	3.00
22258	lb.	——	-	2.50
Naugaromes* (dms.)	lb.	.60	-	3.00
Neutroleum Delta*	lb.	——	-	2.25
Gamma*	lb.	——	-	3.25
Parador A*	lb.	1.80	-	2.10
C*	lb.	2.00	-	2.50
E*	lb.	.25	-	.40
GD 5280*	lb.	2.00	-	2.50
GD 53481*	lb.	1.70	-	2.00
Perfume Oil Bouquet Vanilla M*	lb.	1.60	-	1.70
Rodo No. 0*	lb.	4.00	-	4.50
No. 10*	lb.	5.00	-	5.50
Rubbarome* (dms.)	lb.	.60	-	3.80
Rubber Perfume 12*	lb.	——	-	4.35
Russian Leather 7*	lb.	——	-	4.35
Vanillin	lb.	2.75	-	2.80

BLOWING AGENTS

Ammonium Bicarbonate	cwt.	——	-	9.00
Better Blend Soda* (c.l., bags)	cwt.	——	-	2.70
B-I-K	lb.	.20	-	.22
Blowing Agent No. 81105	lb.	.32	-	.35
Celogen*	lb.	——	-	1.95
AZ*	lb.	1.92	-	1.94
80	lb.	——	-	1.60
Diazo Amino Benzene	lb.	——	-	.73
Kempore R-125	lb.	——	-	1.92
Neo Fat 42-12*	lb.	.10¼	-	.12¼
Opex 40	lb.	——	-	.72
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	——	-	2.55
Unicel ND*	lb.	——	-	.72
S*	lb.	——	-	.20
Urea	lb.	.06	-	.07

BONDING AGENTS

Base 6986*	lb.	.27	-	.32
Braze*	gal.	6.00	-	9.00
Braze Cover Cement*	gal.	2.50	-	4.00
Chemlock 201, 203	gal.	5.00	-	7.50
220	gal.	8.95	-	12.00
401	gal.	5.00	-	24.00
607	gal.	18.00	-	24.00
614	lb.	4.35	-	4.75

BONDING AGENTS (Cont'd)

Durez 12987*	lb.	.47½	-	.49
EX-B501-4	gal.	6.20	-	4.90
EX-B150-1	gal.	8.15	-	11.00
EX-B579-1	gal.	19.40	-	26.40
Gen-Tac Latex*	lb.	.70	-	.75
Hylene M*	lb.	1.25	-	1.50
M-50*	lb.	.86	-	1.11
Penacolite B1A*	lb.	——	-	.95
R-2710*	lb.	——	-	.95
Plobond 20*	gal.	2.91	-	4.23
30*	gal.	3.65	-	4.97
Rex Compounds*	gal.	1.30	-	1.90
Thixons*	gal.	2.95	-	9.80
Ty-Ply Q (BN & S)*	gal.	6.75	-	8.00
Tygobond 30*	gal.	4.10	-	5.40
40*	gal.	5.80	-	6.89
41*	gal.	8.65	-	9.85
45*	gal.	5.75	-	6.48
Vinculux	gal.	——	-	4.95

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	9.00	-	11.00
Glacial 99½% (dms.)	lb.	.12	-	.13
Calcium Nitrate, Tech. Flake	lb.	.07½	-	.09½
Hydroxyacetic Acid—70% (dms.)	lb.	——	-	.09½
Zinc Nitrate, Tech. Flake	lb.	——	-	.20

COLORING AGENTS

Black

Aquablak B*	lb.	.09¾	-	.10¾
M*	lb.	.10½	-	.11
S*	lb.	.11¾	-	.12¼
Black Shield 4*	lb.	.10	-	.10½
No. 6	lb.	.11	-	.11½
No. 17	lb.	.12½	-	.13
No. 19	lb.	.12	-	.12½
Carbon Black—See *Reinforcing Agents*				
Lampblack No. 10*	lb.	.06	-	.09
Mapico Black Iron Oxide* (50 lb. bags)	lb.	.14¾	-	.15
Pure Black Iron Oxide	lb.	.14¾	-	.15

Blue

Akron Masterbatches*	lb.	2.23	-	2.78
Toners*	lb.	2.30	-	6.35
Blue Powders	lb.	2.20	-	3.75
Cooke M.B. Blue* 426	lb.	2.20	-	3.75
Cyan Blue GT 55-3295	lb.	——	-	3.20
XR 55-3760	lb.	——	-	2.90
XR 55-3770	lb.	——	-	3.25
Disco Blues	lb.	2.20	-	3.45
Harmon Blue Toner B-4776	lb.	——	-	2.90
Monastral Rubber Blue CPL*	lb.	1.95	-	1.95
PCD, Dispersed*	lb.	——	-	2.55
Peacoline Blue*	lb.	——	-	3.85
Ramapo Blue*	lb.	2.75	-	3.00
Rubber Blue GD* (Disp.)	lb.	——	-	4.75
Rubber Blue X-1999*	lb.	——	-	1.90
Rubber Dispersed Blues	lb.	2.52	-	2.78
Solfast Blue*	lb.	1.60	-	3.25
Stan-Tone MBS*	lb.	2.20	-	2.92
GPE*	lb.	2.25	-	2.75
PEC*	lb.	1.95	-	2.10
Ultramarine	lb.	.14	-	.30
Vansul Blue M.B.*	lb.	1.00	-	2.70

Brown

Brown Iron Oxide	lb.	.15¾	-	.16
Mapico Brown* (50 lb. bags)	lb.	.15¾	-	.16
Stan-Tone GPE*	lb.	——	-	3.00
Vansul Brown M.B.* (Organic)	lb.	——	-	2.30

Green

Akron Masterbatches*	lb.	1.53	-	3.08
Toners*	lb.	1.50	-	4.35
Chromium Oxide	lb.	.44½	-	.45¼
Cooke M.B. Green*	lb.	1.60	-	2.80
413*	lb.	——	-	2.80
Cyan Green 15-3100	lb.	——	-	3.35
Disco Greens	lb.	1.55	-	2.80
Green Powders	lb.	1.35	-	3.95
Harmon Green Toner G-5056	lb.	——	-	3.95
Hi-Fiz Fluorescent	lb.	1.60	-	2.60
Monastral Rubber Green GSD* (Dispersed)	lb.	——	-	2.80
GSL*	lb.	2.20	-	2.20
Permansa Green CP-1236*	lb.	——	-	1.45
Pigment Green B*	lb.	1.45	-	1.50
GL-652D*	lb.	.90	-	.95
Ramapo Green*	lb.	——	-	3.50
Rubber Dispersed Greens	lb.	1.23	-	3.08
Rubber Green FD* (Disp.)	lb.	——	-	2.05
Rubber Green X-1292*	lb.	——	-	1.75
Serene Green*	lb.	——	-	3.50
Solfast Green*	lb.	1.60	-	3.35
Stan-Tone MBS*	lb.	2.50	-	3.42
GPE*	lb.	1.50	-	1.70
YG*	lb.	2.20	-	2.25
Vansul Green M.B.*	lb.	1.50	-	2.75

Maroon

Akron Masterbatches*	lb.	3.53	-	4.38
Toners*	lb.	.98	-	5.60
Harmon Maroon Toner MV-6606	lb.	——	-	5.75
Pyrolux Maroon*	lb.	——	-	3.40
Vansul Maroon M.B.*	lb.	——	-	4.05

COLORING AGENTS (Cont'd)

Orange

Akron Masterbatches*	lb.	2.53	2.98
Toners*	lb.	2.97	4.30
Benzidene Orange	lb.	—	3.30
Cooke MB*	lb.	2.25	2.35
425*	lb.	—	2.25
Dianisidine Orange*	lb.	—	2.85
Disco Oranges	lb.	2.30	2.85
Harmon Diane Orange Toner Y-25	lb.	—	2.85
Pyrazolone Orange Toner YB-3	lb.	—	3.30
Hi-Fiz Fluorescent	lb.	1.80	2.40
Mercadium X-2667*	lb.	—	1.65
Molybdate Orange	lb.	—	.49
Oswego Orange X-2065*	lb.	—	3.30
Rubber Orange OD* (Disp.)	lb.	—	2.25
Stan-Tone Cadmium Dry*	lb.	1.85	4.28
Cadmium Paste*	lb.	2.43	2.85
GPE*	lb.	1.05	1.20
PC*	lb.	.75	.80
Vansul Orange M.B.*	lb.	2.30	2.65

Red

Akron Masterbatches*	lb.	1.30	3.68
Toners*	lb.	.98	5.60
Arcturus Reds*	lb.	—	1.35
Antimony Trisulfide	lb.	.72	.78
R.M.F. Sulfur Free*	lb.	—	.78
R.M.P. No. 3*	lb.	—	.72
Bonadur 20-6440	lb.	—	1.90
20-6540	lb.	—	2.00
Brilliant Toning Reds*	lb.	1.77	1.90
Cadmolith Red* (dmds.)	lb.	1.94	2.87
Clarion 20-7150	lb.	—	1.35
Cooke M.B. Red*	lb.	1.05	3.25
410*	lb.	—	1.75
Disco Reds	lb.	1.05	3.25
Graphic Red* (dlvd.)	lb.	.98	1.03
Harmon Electra Red Toner	lb.	—	3.45
Lithol Rubine Toner R-6142	lb.	—	1.60
Pyrazolone Red Toner	lb.	—	1.40
Rincon Red Tones	lb.	—	1.90
Hi-Fiz Fluorescent	lb.	1.15	2.15
Kroma Reds*	lb.	.14¼	.14½
Lake Red C*	lb.	—	1.25
Mapico Reds* (50 lb. bags)	lb.	.14¼	.14½
Mercadium X-2668 Light*	lb.	—	1.72
X-2669 Medium Light*	lb.	—	1.80
X-2670 Medium*	lb.	—	1.87
X-2671 Dark*	lb.	—	1.95
Naphthol 20-7575	lb.	—	3.80
Oximony Red Iron Oxide	lb.	.14¼	.14½
Plastic one Red*	lb.	1.02	4.60
Polaris Red*	lb.	—	1.70
Recco Red Oxide*	lb.	.13½	.13¾
Red Iron Oxide, Light	lb.	.14¼	.14½
Red Powders	lb.	—	4.40
Rubber Dispersed Reds	lb.	1.47	3.58
Rubber Red PBD* (Disp.)	lb.	—	2.05
2BD, Dispersed*	lb.	—	2.00
2BL*	lb.	1.24	1.24
PBL*	lb.	1.24	1.24
Rubanox Reds*	lb.	1.47	1.60
Rubber Red CP-339* (dlvd.)	lb.	—	1.10
Rubber Red X-1148*	lb.	—	.98
Solfast Red*	lb.	1.47	1.80
Stan-Tone MBS*	lb.	1.00	3.75
GPE*	lb.	.70	3.05
PC*	lb.	1.10	1.45
Vansul Red M.B.*	lb.	1.00	3.35
Watchung Red*	lb.	1.90	1.90

Tan

Mapico Tan 15* (50 lb. bags)	lb.	.23¼	.23½
20* (50 lb. bags)	lb.	.23¼	.23½

White—Lithopone

Permolith*	lb.	.0825	.09125
Sunolith*	lb.	.0800	.0875

White—Titanium Pigments

Iceberg*	lb.	—	.0265
Icecap K*	lb.	—	.03¼
Horse Head Anatase Grades*	lb.	.25½	.26½
Rutile Grades*	lb.	.27½	.28½
Stan-Tone PC*	lb.	.55	.60
Ti-Cal*	lb.	.09	.09¾
R-22*, R-25*, R-27*, R-30*	lb.	.09¾	.09¾
R-60*	lb.	.09¾	.10½
Ti-Pure*	lb.	24½	27½
Anatase Grades*	lb.	25½	26½
R-100*, R-500*	lb.	.27½	.28½
Titanox A*—all grades (dlvd.)	lb.	.25½	.26½
C-50* (dlvd.)	lb.	.14⅜	.14⅞
RA* (dlvd.)	lb.	.27½	.28½
RA-10* (dlvd.)	lb.	.27½	.28½
RA-NC* (dlvd.)	lb.	.27½	.28½
RC* (dlvd.)	lb.	.09¾	.10½
RC-HT* (dlvd.)	lb.	.09¾	.09¾

COLORING AGENTS (Cont'd)

White—Titanium Pigments (Cont'd)

Unitane O-110*	lb.	.25½	.26½
O-220*	lb.	.25½	.26½
O-310*	lb.	.25½	.26½
OR-150*	lb.	.27½	.28½
OR-250*	lb.	.27½	.28½
OR-340*	lb.	.27½	.28½
OR-342*	lb.	.27½	.28½
OR-350*	lb.	.27½	.28½
OR-540*	lb.	.27½	.28½
OR-640*	lb.	.27½	.28½
Zopaque*	lb.	.24½	.25½
R*	lb.	.26½	.27½

White—Zinc Oxide (American Process)

AZODOX 44, 45	lb.	.1450	.1550
AZO-ZZZ 11*, 22*, 33*, 44* 55*	lb.	.1450	.1550
Eagle-Picher AAA*	lb.	.1450	.1550
Horse Head Special*	lb.	.1450	.1550
XX*	lb.	.1450	.1550
Protox 166*	lb.	.1450	.1550
167*	lb.	.1450	.1550
267* (pelleted)	lb.	.1450	.1550
St. Joe Black Label* 20, 20-21	lb.	.1450	.1550
Red Label* 30, 31	lb.	.1450	.1550
Green Label* 12, 46 (latex only)	lb.	.1450	.1550
Green Label* 42, 42-21, 42A-3, 43 Pelets	lb.	.1450	.1550

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	—	.13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.1450	.1550
Florence Green Seal*	lb.	.1625	.1725
Red Seal*	lb.	.1575	.1675
White Seal*	lb.	.1675	.1775
Kadox 25*	lb.	.1500	.1600
15*, 17*, 72* & 515	lb.	.1450	.1550
Protox 168*	lb.	.1450	.1550
169*	lb.	.1450	.1550
268* (pelleted)	lb.	.1450	.1550
U.S.P. (cartons)	lb.	.1775	.1875
XX-78*	lb.	.1450	.1550

White—Zinc Sulfide

Cryptone ZS*	lb.	.2530	.2630
Lehigh 12%*	lb.	.1250	.1350
18%*	lb.	.1400	.1500
35%*	lb.	.15375	.16375
50%*	lb.	.1575	.1675

Yellow

Akron Masterbatch*	lb.	1.27	2.48
Toners*	lb.	2.20	6.00
Benzidene-Lightfast	lb.	3.40	5.35
Benzidine Yellow	lb.	1.41	2.55
Cadmolith Yellow (dms.)	lb.	—	1.19
Chrome Yellow	lb.	.35	.35
Cooke M.B. Yellow 405*	lb.	2.15	2.75
Disco Yellows	lb.	2.05	3.95
Harmon Benzidene Yellow Toner YB-2	lb.	—	2.25
Fanchon Yellow Toner	lb.	—	2.20
Hi-Fiz Fluorescent	lb.	1.60	2.60
Iron Oxide, Pure Light Shades	lb.	.12½	.12¾
Dark Shades	lb.	.12	.12¼
Mapico Yellow* (50 lb. bags)	lb.	.12	.12¼
Rubber Dispersed Yellows	lb.	1.27	2.13
Rubber Yellow GD* (disp.)	lb.	—	2.25
GL*	lb.	—	1.68
Rubber Yelow X-1940*	lb.	—	2.25
Stan-Tone Cadmium Dry*	lb.	2.80	3.03
Cadmium Paste	lb.	1.72	1.82
MBS*	lb.	1.30	2.20
GPE*	lb.	.70	3.25
PC*	lb.	.55	3.50
Toluidine Yellow	lb.	2.20	2.20
YL-660 D*	lb.	1.25	1.35
Oximony Iron Oxide	lb.	.14¼	.14½
Vansul Yellow M.B.*	lb.	1.15	2.15
Yellow Powders	lb.	2.00	5.00
Zinc Yellow	lb.	.29	.29

DISPERSING AGENTS

Anchoid*(†)	lb.	.24	.25
Anhydrapent*	lb.	.56	.59
Armeen 18*	lb.	.39	.45
Belloid TD*	lb.	.15¾	.16¾
Blancol*	lb.	—	.15¾
Darvan No. 1*	lb.	.25¼	.38¼
No. 2*; No. 3*	lb.	.23¾	.36¾
No. 6*	lb.	.18½	.19
No. 7*	lb.	.26¼	.36¼
Daxad 11* (21*, 23*)	lb.	.08	.30
Diethanolamine (dms., dlvd.)	lb.	.24½	.27
Dispersaid*	lb.	1.25	1.35
Emcol K-8300* (dms.)	lb.	.14	.18
P10-59	lb.	.32	—
5120	lb.	.31	—
5138	lb.	.31	—
Emulphor ON-870*	lb.	—	.55
Furala*	lb.	.06½	.07½
Halloid*	lb.	.04½	.05½
Igepal CO-630*	lb.	—	.29
Igepon T-73*	lb.	—	.29½
Kyro EO* (dms.)	lb.	—	.29¾
Leonil SA*	lb.	—	.55

DISPERSING AGENTS (Cont'd)

Lipal No. 9N*; 11-O*	lb.	.28	.29
Lomar PW*	lb.	.15¼	.15¾
Marasperse C*	lb.	.06¼	.06¾
CB*	lb.	.15	.17
N*	lb.	.09½	.10½
Monoethanolamine (dms., dlvd.)	lb.	.25	.27½
Naccosol A (dlvd.)	lb.	—	.52
Naccotan A*	lb.	.16½	.17
Nekal BA-75*	lb.	—	.40
BX-78*	lb.	—	.64
Nopcosant*	lb.	.15¼	.15¾
Pluronic F68*	lb.	.38½	.44
Polyfon*	lb.	.08	.10
R & R 551*	lb.	—	.28
Stablex B*	lb.	.50	.95
Stan-Chem BQC*	lb.	.12¼	.17¾
1067*	lb.	—	.13½
1471*	lb.	.1687	.2187
2251*	lb.	.12¼	.17¾
Trenamine D-25*	lb.	.32½	.36
Triethanolamine (dms., dlvd.)	lb.	.22	.25½
Yelkin TT* (and TTS*)	lb.	.13	.16

EXTENDERS

Arcco 1294-36B*	lb.	.11½	.12½
Car-Bel-Ex-A*	lb.	—	.144
Extender 600*	lb.	—	.1870
Facile Gum 4A*	lb.	.48	.50
Millex*; W*	lb.	—	.07
Nopco 2271*	lb.	.16¾	.18¾
OPD*	lb.	.29	.40
Polyco 418*	lb.	.17	.18
PR-162 Latex Extender*	lb.	—	.182
Solvitose HDF*	lb.	.22	.25
Synprolac*	lb.	.16	.23
Synprowax*	lb.	—	.23
Vanadiset B*	lb.	.0360	.07
C*	lb.	.0310	.06
MR* 80 mesh	lb.	.08½	.12½
Vistanex MM Grades*	lb.	—	.35
Wilcarbo Carbon Powders*	lb.	.08	.15

FILLERS (Inert and Reinforcing)

Abrasives			
Carbonite*	lb.	.21½	1.35
Lionite*	lb.	.16	1.27
Pumice	lb.	.03	.05
Walnut Shell Grits	ton	60.00	-110.00
Aluminum Hydrate	lb.	.031	.170
Kaiser Aluminum Hydrate*	lb.	.035	.065
Aluminum Silicate			
AFD*	ton	29.50	36.00
Aluminum Flake*	ton	29.50	36.00
Marter White*	ton	18.50	30.00
Barium Carbonate (l.c.l.)	ton	109.00	-126.50
Barytes			
No. 1 Floated, White*	ton	55.00	79.85
No. 2 Floated, Unbleached*	ton	50.00	74.85
No. 22 Barytes* (c.l.)	ton	—	30.00
No. 3805 Barytes*	ton	22.00	26.75
Foam A*	ton	60.00	84.85
Sparmite*	ton	80.00	90.00
XIOR*	ton	90.00	95.00
Bentonite (c.l.)	ton	—	13.50
Argosite Clay* (c.l.)	ton	—	12.50
Bennett Clay* (c.l.)	ton	—	32.50
SPV Volclay* (c.l.)	ton	—	13.50
White Hi-Gel*	ton	—	65.90
Blanc Fixe	ton	125.00	-142.00
Calcium Carbonate			
Allied Whiting	ton	—	11.50
Atomite* (c.l.)	ton	32.50	35.00
B.I. White No. 1 (c.l.	ton	—	10.00
Calcene NC*	ton	80.00	-100.00
TM*	ton	82.50	-102.50
Calwhite*	ton	20.00	25.00
T*	ton	25.00	30.00
Camel-Carb*	ton	—	14.00
Camel-Tex*	ton	—	22.00
Camel-Wite*	ton	—	35.00
Carbium	ton	30.00	40.00
CCC "G"*	ton	15.00	17.00
CCC No. 1*	ton	10.50	12.50
CCO White*	ton	—	22.00
Duramite*	ton	20.00	22.00
Gamaco* (c.l.)	ton	32.50	37.50
T*	ton	37.50	42.50
GamaKal*	ton	37.50	42.50
Georgia Marble 5-25* (c.l.)	ton	—	20.00
No. 10 White* (c.l.)	ton	—	11.00
Kalite*	ton	52.50	67.50
Kalmac*	ton	23.00	28.00
Laminar*	ton	—	30.00
Lesamite* (c.l.)	ton	—	27.50
Lorite*	ton	30.00	36.00
Millical*	ton	38.00	53.00
Multifex MM*	ton	117.50	-137.50
Non-Fer-Al*	ton	35.00	50.00
Purecal M*	ton	65.00	85.00
SC* (and T*)	ton	117.50	-137.50
U*	ton	127.50	-147.50
PPTD* (c.l.)	ton	—	30.00
Rambo No. 1*	ton	—	11.50
Snowflake*	ton	20.00	22.00
Super Multifex*	ton	167.50	-187.50
Surfex*	ton	42.00	57.00
Suspenso*	ton	38.00	43.00
Witcarb Reg.*	ton	60.00	85.00
R*	ton	127.50	-150.00
RC*	ton	117.50	-140.00
York White*	ton	—	11.50

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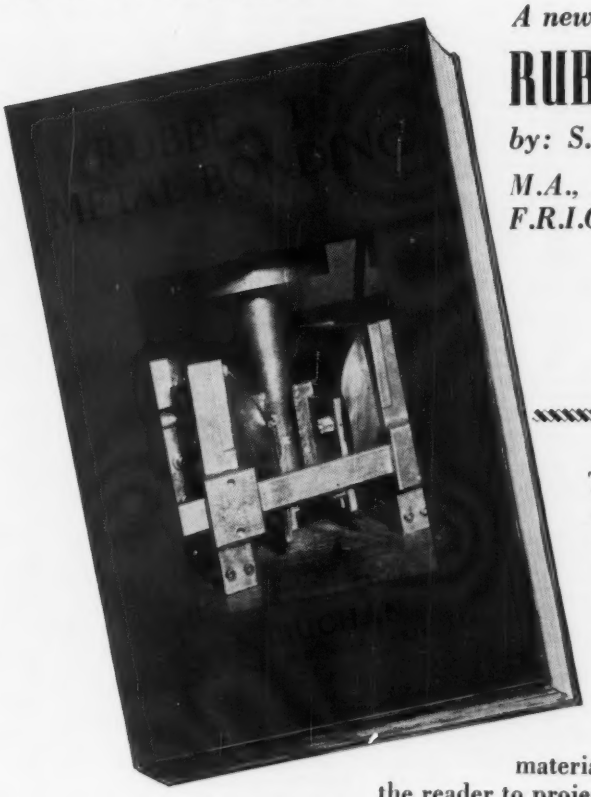

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FILLERS (Cont'd)

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Calcium Sulfate, Anhydrous			
Snow White Filler*	ton	——	22.00
Calcium Sulfate Hydrous			
Terra Alba No. 1*	ton	——	17.00
Chalk Whiting (l.c.l.)	lb.	.01½	.01¾
Recco Paris Whiting*	ton	——	35.00
OMYA Whiting*	ton	——	35.00
Clay			
Afton Clay*	ton	13.00	38.00
Aiken Clay*	ton	14.50	——
Akron HC-100*	ton	14.50	——
HC-75*	ton	13.00	——
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C	ton	25.00	——
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292	ton	36.00	95.00
315; 350	ton	137.00	225.00
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F 6000*	lb.	——	.36
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Silvacon* (c.l.)	ton	55.00	100.00
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Lignin	lb.	.06	.08
Limestone, Pulverized	ton	3.00	5.00
Asbestol Regular*	ton	28.00	——
Asbestol Superfine*	ton	33.00	——
Georgia Marble No. 10*	ton	——	11.00
Industrial Filler No. 100*	ton	——	7.75
Micro Velva A*	ton	53.00	——
L*	ton	61.00	——
No. 1 White*	ton	——	11.00
Magnesium Carbonate	lb.	.10½	.13
K & M Technical* (c.l., eqld.)	lb.	.10½	.12
Marinco CL*	lb.	.11	.13
Michigan*	lb.	.11	.15
Magnesium Silicate (see Talc)			
Mica	lb.	.01¼	.07¾
Concord*	lb.	.08	.08¾
Micro-Mica*	lb.	.08	.08¾
Mineralite* (c.l.)	ton	40.00	85.00
Silversheen*	lb.	.08	.08¾
Triple A Mica* (c.l.)	ton	——	40.00
Vermiculite*	lb.	——	.11
Wet Ground Biotite Mica	lb.	.06½	.07¼
Wet Ground Mica No. 160*	lb.	.08	.08¾

FILLERS (Cont'd)

Pecan Shell Flour			
Stan Shell*	ton	45.00	75.00
Pyrophyllite			
No. 261*	ton	——	11.50
Pyrax A* (c.l.)	ton	14.50	15.00
WA* (c.l.)	ton	17.00	17.50
Sawdust, Graded	ton	14.00	35.00
Silica	ton	16.00	27.00
Extra Fine (bags) (c.l.)	ton	——	43.00
Slate, Powdered (l.c.l.)	ton	15.00	20.00
Lo-Micron Slate Flour*	lb.	——	.04½
No. 133 Slate Flour*	ton	——	4.55
Sodium Silico Aluminate			
Zeolex 23*	lb.	.06	.07
Talc (Magnesium Silicate)			
Akron Soapstone*	ton	——	9.75
Asbestol Regular*	ton	——	27.00
Eastern RC-500*	ton	——	32.00
No. 41*	ton	——	19.70
No. 549*	ton	——	63.00
French*	ton	——	59.00
No. 367*	ton	——	13.00
No. 1600*	ton	——	70.60
No. 1768*	ton	——	13.00
Nytal 200* (c.l.)	ton	——	28.00
300* (c.l.)	ton	——	38.00
Sierra Fibrene C-400*	ton	34.00	40.00
Sierra Supreme 325*	ton	51.00	56.00
Sierra White*	ton	21.75	26.75
Soapstone*	ton	——	13.00
Walnut Shell Flour	ton	55.00	100.00
Agrashell*	ton	55.00	115.00
Stan-Shell*	ton	50.00	110.00
Whiting, Commercial	ton	——	7.50
Allied Whiting*	ton	——	11.50
Camel-Carb*	ton	——	10.00
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C-C-O White*	ton	——	22.00
Georgia Marble No. 15*	ton	——	20.00
No. 10*	ton	——	20.00
Piqua No. 1 YAA* (c.l.)	ton	10.00	10.00
No. 2 LS* (c.l.)	ton	10.00	10.00
Snowflake* (c.l.)	ton	20.00	22.00
Stan-White 325*	ton	11.50	14.10
Ultrasil*	lb.	.35	.50
Veroc* (c.l.)	ton	——	11.50
Welco* (c.l.)	ton	——	10.50
York White R* (c.l.)	ton	——	11.00
Wood Flour	ton	31.50	48.00

FINISHING MATERIALS, SURFACE

Beaco Finishes*	gal.	2.10	2.35
Black Out*	gal.	4.50	8.00
Calcium Hypochlorite (dms.) (cwt.)	ton	33.30	37.90
Shellac, Orange Gum	lb.	.35	.45
VanWax*	gal.	2.00	2.05

FLAME RETARDANTS

Celluflex CEF* (dms.)	lb.	——	.65
Chlorowax 40*	lb.	.15	.17½
50*	lb.	.16	.18½
70*	lb.	.18½	.20
Halowax*	lb.	.36	.46
Zinc Borate 3167*	lb.	.1920	.2020
Zyrox Compounds*	lb.	.38	.95½

LATEX MODIFIERS

Crux*	lb.	.30	.65
Foamnix*	lb.	.60	1.50
Ludox	lb.	.15	.16¾
Nopco EB*	lb.	.16¾	.18¾
EB-1*	lb.	.16¾	.18¾
EB-5*	lb.	.19½	.21½
OPD-101*	lb.	.29	.40
Piccopale A-1 Emulsion	lb.	.086	.113
A-20	lb.	.089	.116
A-22	lb.	.097	.124
A-41; A-43	lb.	.0775	.0145
C-1	lb.	.091	.118
N-3	lb.	.100	.127
STAYB*	lb.	.25	.45
Syton 200	lb.	.15	.16¼
Ubatol U-2001* (t.c.)	lb.	.166	.187
U-2003* (t.c.)	lb.	.184	.208
U-2007* (t.c.)	lb.	.166	.187
U-3025* (c.l.)	lb.	.223	.235
U-3040* (c.l.)	lb.	.260	.272
U-3045* (c.l.)	lb.	.260	.272
U-3050* (c.l.)	lb.	.195	.207
Webnix*	lb.	1.25	2.00

LUBRICANTS, MOLD

Akro Gel*	lb.	——	.165
Alipal CO-433*	lb.	——	.20
CO-436*	lb.	——	.24
Aluminum Stearate Crown Brand*	lb.	.37	.42
Amine, Mixed Crude*	lb.	.19	.25
Aquadag*	lb.	3.50	4.00
Aquarex D*	lb.	——	.81
L*	lb.	——	.94
ME*	lb.	——	.82
MDL*	lb.	——	.33
WAQ*	lb.	——	.22
Armeen HT*	lb.	.34	.40
180*	lb.	.52	.56
Armid HT (flaked)*	lb.	.42	.46
0*	lb.	.39	.41
Borax Granular (l.c.l.)	ton	89.00	94.00

LUBRICANTS, MOLD (Cont'd)

Carbowax 4000*	lb.	.31	.32
CD Mold Release B*	gal.	5.00	——
B-2*	gal.	5.00	——
Colite Concentrate* (dms.)	gal.	.90	1.15
Colite D43D*	gal.	1.15	1.40
Concentrex*	lb.	——	.25
Dag Dispersion No. 197*	lb.	1.95	2.90
D.C. 7 Compound*	lb.	4.70	5.80
D.C. Emulsion No. 7*	lb.	1.59	2.07
No. 8*	lb.	1.15	1.69
No. 35*; 35A*	lb.	1.15	1.69
No.35B*	lb.	1.15	1.69
No. 36*	lb.	1.15	1.69
D.C. Mold Release Fluid*	lb.	2.90	3.47
Dri-Lube*	lb.	——	.22
Dry-Flo* (50 lb. bags)	lb.	21.40	——
Emulsion Lubricant A80*	lb.	——	1.20
45*	lb.	——	1.20
G-E Silicone Emulsion SM-55*	lb.	1.15	1.69
SM-61*	lb.	1.15	1.69
SM-62*	lb.	1.15	1.69
G-E Silicone Fluid SF-92*	lb.	2.90	4.05
SF-96*	lb.	2.90	4.05
Hawkeye Flake* (dlvd.)	lb.	.11½	.13¼
Igepal CO-430*	lb.	——	.29
CO-630*	lb.	——	.29
CO-530*	lb.	——	.29
Igepon AP-78*	lb.	——	.48
T-33*	lb.	——	.21
T-51*	lb.	——	.13½
Kokobace R*	lb.	.17½	.18½
Lipal 9-N*	lb.	.28	.29
7-O*	lb.	.29	.30
Lubrex	lb.	.25	.30
Lubri-Flo*	gal.	10.00	12.00
Migralube*	lb.	——	.35
ML-1027-2C*	gal.	——	2.65
ML-1028-2C*	gal.	——	2.65
Mold Lubricant No. 72 Conc.* (dms.)	gal.	——	1.90
Mold Lubricant No. 426* (dms.)	lb.	.18	.17
No. 735* (dms)	gal.	——	1.25
No. 769* (dms.)	gal.	——	1.20
No. 825* (dms.)	gal.	——	2.00
No. 856* (dms.)	gal.	——	1.90
No. 880* (dms.)	gal.	——	1.19
No. 887* (dms.)	gal.	——	1.80
No. 935* (dms.)	gal.	——	1.56
No. 956* (dms.)	gal.	——	2.50
No. 965* (dms.)	gal.	——	2.15
No. 967* (dms.)	gal.	——	2.40
No. 969* (dms.)	gal.	——	1.50
No. 970* (dms.)	gal.	——	4.50
No. 975* (dms.)	gal.	——	2.85
No. 980* (dms.)	gal.	——	1.53
No. 987* (dms.)	gal.	——	2.45
A 187* (dms.)	gal.	——	1.90
A 256* (dms.)	gal.	——	1.20
A 988* (dms.)	gal.	——	2.60
Moldeze No. 3*	gal.	——	4.95
Mold-Brite*	gal.	——	1.50
Monopole Oil MD*	lb.	——	.16
MR-22 Silicone Semi-Permanent	gal.	9.95	14.95
Olate Flakes*	lb.	.23½	.24¾
Orvus WA Paste* (dms.)	lb.	——	.23¼
Plaskon Polyethylene S*	lb.	.32	.47
Poly-Brite PE-20	lb.	.28	.42
600	lb.	.42	.58
Poly-Cone 125X	lb.	1.15	1.30
1,000	lb.	.91	1.04
Polyglycol 15-200*	lb.	.25	.28¾
E4000*	lb.	.31	.37
Prodag*	lb.	.32	.60
Purity Flake* (dlvd.)	lb.	.14¾	.16½
Rubber-Flo*	gal.	1.25	2.00
Rubber-Glo*	gal.	——	.94
Rusco Mold Paste*	lb.	.25½	.32
Sericite* (l.c.l.)	ton	65.00	75.00
Silicone Oil A145*	lb.	3.22	3.61
A220* (dms.)	lb.	——	2.80
Silrex (dms.)	lb.	——	.65
Rubars*	lb.	——	.22¾
Soybean Lecithin	lb.	.13	.17
Thermalube*	lb.	——	.13¾
UC Silicone L-45*	lb.	2.90	4.61
L-522*	lb.	2.68	3.50
LE-45*	lb.	1.15	1.69
LE-450*	lb.	1.15	1.69
Ucon Lubricants*	lb.	.26¾	.27¾
Ulco Mold Soap*	lb.	.19	.29

LUBRICANTS, RUBBER

Cyclolube NN-1; NN-2; NN-3	gal.	.12½	.20½
NN-4	gal.	.13½	.21½
114	gal.	.19	.27
4053	gal.	.21	.29
Diglycol Stearate Neutral (and SE) (dms.)	lb.	——	.25
Extrud-o-Lube*	gal.	1.33	1.54
Ivory Chips*	lb.	.19¾	.20¾
LatexLube GR* (dlvd)	lb.	.19¼	.21½
No. 82-A* (450 lb. dms.)	lb.	——	.08½
Nopcowax 22-DS*	lb.	.38½	.41
Propylene Stearate (dms.)	lb.	.35	.60
Versa-Lube B*	lb.	.16	.18

LUBRICANTS, RUBBER SURFACE

Antidust	lb.	.37	.41
Barium Stearate	lb.	.41	.46
Calcium Stearate	lb.	.39	.44
Crown Brand*	lb.	.37	.42
D.C. 7 Compound*	lb.	4.70	5.80
D.C. 200 Fluid*	lb.	2.90	3.47
ELA*	lb.	—	.82
G-E Silicone Fluid SF-92*	lb.	3.04	4.25
Glycerized Lubricant*	gal.	1.25	1.48
Glydag B*	lb.	1.60	2.25
Glyso-Lube* (dms.)	lb.	—	.14
No. 3* (dms.)	lb.	—	.14
Hydro-Zinc*	lb.	—	.20
Latex-Lube Pigmented* (dlvd.)	lb.	.17¼	.19¼
R-66*	lb.	—	.17¼
Liqui-Lube* (dlvd.)	lb.	—	.17¾
N.F.* (dlvd.)	lb.	—	.17¾
N.T.* (dlvd.)	lb.	—	.16¾
Lubrex*	lb.	.27	.32
Lubri-Cote	gal.	.86	1.00
Magnesium Stearate	lb.	.42	.47
Crown Brand*	lb.	.40	.45
Polyethylene Glycol	lb.	.22	.26
Rexanol*	lb.	—	.13
Rubber Free (Concentrate)*	gal.	—	1.44
Jel*	lb.	.18	.21½
Separex*	lb.	.08½	.10½
Slab-Dip* (dms.)	lb.	—	.17
Soybean Lecithin	lb.	.13	.17
Stock-Lube*	lb.	—	.19
UC L-45*	lb.	2.90	4.61
L-522*	lb.	2.68	3.50
LE-450*	lb.	1.15	1.69
XL-42*	lb.	3.10	4.75
XLE-42*	lb.	1.22	1.70
XLE-420*	lb.	1.18	1.70
Wet Zinc*	lb.	—	.22¼
CW*, P*	lb.	—	.20
Zinc Stearate	lb.	.41	.46

MOLD CLEANERS

Actusol* (dlvd.)	gal.	1.45	1.65
Alkon* (dlvd.)	lb.	.16	.16½
CA-301*	gal.	—	2.49
CA-302*	gal.	—	2.63
G-O 6910*	lb.	.38	.40
Metso Anhydrous*	cwt.	5.70	7.95
Metso 99*	cwt.	5.00	7.25
200*	cwt.	6.70	8.95
Granular*	cwt.	4.45	6.70
Orvus Extra Granules*	lb.	.23¼	.24¾
Polo*	lb.	.12¾	—
Rubber-Sol*	gal.	2.97	3.97
Shelblast*	lb.	.04	.08¾
Sprex A.C.* (dlvd.)	lb.	.17¾	.18¾
Zip Mold Cleaner*	gal.	1.05	1.55

PEPTIZING AGENTS

Peptizer P-12*	lb.	.95	1.25
Pepton 22 Plasticizer*	lb.	.83	.86
65*	lb.	1.23	1.26
65B*	lb.	.83	.86
Pitt-Consol 640 (dms.)	lb.	—	.42
RPA 2*	lb.	—	.85
3*	lb.	—	.51
3 Conc.*	lb.	—	.85
6*	lb.	—	1.66

PLASTICIZERS & SOFTENERS

Actisil	lb.	.26	.27
Acto 500*	lb.	—	.0[illegible]
Adipol BCA*	lb.	.47	.47½
2EH*	lb.	.42½	.44
10A*	lb.	.42½	.44
ODY*	lb.	.42½	.44
810*	lb.	.42½	.45½
XX*	lb.	.42½	.44
Admex 562 (dms.)	lb.	.50¾	.51¾
710 (dms.)	lb.	.35¾	.36¼
711 (dms.)	lb.	.37¾	.38¼
744 & 745 (dms.)	lb.	.41¾	.42¼
760 (dms.)	lb.	.59¾	.60¼
761 (dms.)	lb.	.46¾	.47¼
770 (dms.)	lb.	.42¼	.43
Anhydrol 6990*	lb.	.51	.56
Arneel SD*	lb.	.34	.40
Arolene 1980* (c.l.)	lb.	—	.10
Aromatic Plasticizer 10* (and 25*) (dms.)	lb.	.08	.08½
Aromatic Tar	gal.	.0573	.1973
Bardol*	lb.	.02¾	.03¾
B*	lb.	.06¼	.06½
Bayol D*	gal.	—	.382
F*	gal.	—	.52
Bearflex 1751*	lb.	.14	.15
LPO*	lb.	.03	.04
MPO*	lb.	.03¾	.04¾
Beeswax, Bleached	lb.	73	.75
Yellow Refined	lb.	.64	.65
Bondogen*	lb.	.55½	.60½
B.R.C. No. 20*	lb.	.0150	.0175
No. 21*	lb.	.02¾	.03
No. 22*	lb.	.02½	.02¾
B.R.H. 2*	lb.	.0213	.0351
BRS 700*	lb.	.0200	.0285
B.A.T. 3*	lb.	.0180	.0265
4*	lb.	.0250	.0260
7*	lb.	.0300	.0310

PLASTICIZERS & SOFTENERS (Cont'd)

B.R.V.*	lb.	.0475	.0565
Bunarex Resins*	lb.	.07	.08
Bunatak AH*	lb.	—	.09½
N*	lb.	—	.31
U*	lb.	—	.17½
No. 90*	lb.	—	.09
No. 210*	lb.	—	.14
Butac*	lb.	.1635	.1735
Butyl Carbitol Periargonate (dms.)	lb.	—	.64½
Butyl Cellosolve Periargonate (dms.)	lb.	—	.68
Butyl Oleate	lb.	.26	.27
Butyl Palmitate	lb.	—	.26½
Butyl Stearate (dms.)	lb.	.26	.27
Byerflux*	gal.	.24	.27
Califlux 510* (and 550*)	lb.	.02¾	.03¾
G.P.*	lb.	.01½	.02½
R-100*	lb.	.04¾	.05¾
LBL*	gal.	.17	.25
OSR*	lb.	.01⅞	—
RC*	gal.	.13½	.21½
TT*	lb.	.0195	.0295
Candelilla Wax, Prime	lb.	.53	.64
Refined Light	lb.	.56	.60
Carbowax 4000* (dms.)	lb.	.68	.70
Cardolite NC-103*	lb.	.36	.59
Carnauba Wax, Crude	lb.	.73	.74
Flaked	lb.	.73	1.25
Refined, Technical	lb.	.73	.74
Refined, Pure	lb.	.82	.86
Yellow	lb.	1.10	1.15
Cellufiex* (dms.)			
112* (t.c., dlvd.)	lb.	—	.32½
179-A* (t.c., dlvd.)	lb.	—	.32½
179-C* (t.c., dlvd.)	lb.	—	.32½
179-EG* (t.c., dlvd.)	lb.	—	.32½
DBP* (t.c., dlvd.)	lb.	—	.30
DOP* (t.c., dlvd.)	lb.	—	.28½
TPP* (dms., eqld.)	lb.	—	.40
Ceresin Wax	lb.	.12	.30
Chlorowax 40*	lb.	.15	.17½
50*	lb.	.16	.18½
70*	lb.	.18½	.20
LV*	lb.	.17	.19½
CTLA Polymer*	gal.	.20	.36
Cumar Resins*	lb.	.07	.19
Cyclolube OSR*	gal.	.28	.36
Darex DBM*	lb.	.30½	.34
DBP*	lb.	.30	.33½
DOP*	lb.	.30½	.33½
DIOP*	lb.	.30½	.33½
D.B.M.*	lb.	.32	.34¾
Decylbutyl Phthalate	lb.	.27	.29½
Degras, Common		—	.14
Diallyl Phthalate	lb.	.51½	.52½
Dibenzyl Sebacate (dms.)	lb.	.93	.93½
Dibutoxyethyl Sebacate	lb.	—	.61½
Dibutyl Phthalate (dms.)	lb.	.31½	.33
Dibutyl Sebacate	lb.	.67½	.68
Dicapryl Adipate (dms.)	lb.	.41½	.42½
Dicapryl Phthalate (dms.)	lb.	.27½	.29
Dicapryl Sebacate	lb.	.58	.59½
Di-Carbitol Phthalate (dms.)	lb.	.50½	.51
Dicyclohexyl Phthalate	lb.	.45	.46½
Diethyl Phthalate (dms.)	lb.	.29¾	.31¼
Di-2-ethylhexyl Phthalate (dms.)	lb.	.29	.30½
Dihexyl Adipate (dms.)	lb.	.46½	.47
Dihexyl Phthalate (dms.)	lb.	.32½	.33½
Dihexyl Sebacate (dms.)	lb.	.66	.66½
Diisopropyl Azelate	lb.	—	.47½
Diisobutyl Phthalate	lb.	.30	.31½
Di-iso-octyl Adipate	lb.	.42½	.43½
Dimethyl Phthalate (dms.)	lb.	.29¾	.31¼
Dimethyl Sebacate (dms.)	lb.	1.30	1.30½
Dinonyl Adipate	lb.	.44½	.47½
Dinopol IDO*	lb.	.29½	.31
MOP*	lb.	.30½	.32
Dioctyl Adipate (dms.)	lb.	.42½	.43½
Dioctyl Phthalate (dms.)	lb.	.29	.30½
Dioctyl Sebacate (dms.)	lb.	.61¼	.62¼
D.I.O.P. (dms.)	lb.	.28½	.30
Dipolymer Oil	gal.	.33	.48
Dispersing Oil No. 10*	lb.	.06	.06¼
Dutrex* 1, 6, 7	gal.	.18	.23
6H	gal.	.13	—
15E	gal.	.11	.23
20, 25	lb.	.03	.06
33	gal.	.21	.33
DX-111	lb.	.13¼	.14¼
DX-111 NS	lb.	.14¼	.15¼
DX-40	lb.	.14¾	.15¾
Elastex 10-P*	lb.	.30½	.33½
50-B*	lb.	.25	.28
DCHP*	lb.	.59	.60
Emulphor EL-719*	lb.	—	.58
Epoxy Plasticizer	lb.	.33½	.36
Drapex 3.2*	lb.	.39¼	.40¼
Drapex 4.4*	lb.	.34¾	.35¾
Drapex 7.7*	lb.	.37	.38
Esparto Wax	lb.	—	.55
Estac*	lb.	—	.16
Facile Gum 4A*	lb.	.48	.50
Flexol B-400*	lb.	.29	.30
DOP*	lb.	.29	.30½
TOF*	lb.	.47	.48
3GH*	lb.	—	.46¾
3GO*	lb.	—	.55¾
4GO*	lb.	—	.36½
426*	lb.	.28½	.30
Flexricin P-1*	lb.	.33½	.36½
P-4*	lb.	.30½	.33¼
P-6*	lb.	.37	.40
P-8*	lb.	.30¼	.33¼

PLASTICIZERS & SOFTENERS (Cont'd)

Fortex A* (dms.)	lb.	.12½	.14½
Fura-Tone NC-1008*	lb.	.28	.39
Galex W-100*	lb.	.15½	.19¾
Good-rite GP233*	gal.	.40	.43½
GP235*; GP236*	lb.	.40	.43½
GP261*	lb.	.28	.31½
GP265*	lb.	.28½	.32
GP266*	lb.	.29	.32½
GP-266-BPA*	lb.	.29	.32½
Hallco C-255-NS*	gal.	.27½	.29½
C-566*	lb.	.11	.13
Harflex 300* (dms.)	lb.	.60½	.61
325* (dms.)	lb.	.45	.45½
330* (dms.)	lb.	.46¼	.46¾
375* (dms.)	lb.	.76	.76½
HB20*	lb.	.17	.18½
HB40*	lb.	.21½	.23
Herron-H.T.*	gal.	.16	.27
Herron-Plas*	lb.	—	.03¾
Herron-Wax*	lb.	.05¼	.06
No. 23*	lb.	.08¼	.08¾
No. 24*	lb.	.07¼	.07¾
HSC No. 13*	lb.	.25	.32
No. 39*	lb.	.22	.29
Indonex W-2*	gal.	.12	—
Isooctyl Decyl Phthalate (dms.)	lb.	.28	.29½
K-stay*	lb.	.12	.13
Kapsol*	lb.	.35	.35½
Kenflex A & N*	lb.	.19	.34
Kesscoflex BCL* (dms.)	lb.	—	.37
BCO* (dms.)	lb.	—	.33
BCP* (dms.)	lb.	—	.36
BCS* (dms.)	lb.	—	.32
BO* (dms.)	lb.	—	.28¼
BS* (dms.)	lb.	—	.27½
DBT* (dms.)	lb.	—	.68
DIOA* (dms.)	lb.	—	.43½
DOA* (dms.)	lb.	—	.43½
MCO* (dms.)	lb.	—	.35½
MCP* (dms.)	lb.	—	.41
MCS* (dms.)	lb.	—	.35
TRA* (dms.)	lb.	—	.40
KP 20*	lb.	.28½	.30
23*	lb.	.32½	.33½
90*	lb.	.42½	.44
140*	lb.	.48	.48½
201*	lb.	.46½	.48
260*	lb.	.36½	.38
Kremol 40*	gal.	.36	.46
50*	gal.	.39	.49
Kronisol* (dms.)	lb.	.38	.39
Kronitex AA* (dms.)	lb.	.35	.36
I, K-3, MX*	lb.	.35	.36
Lanolin, Tech. Anhydrous	lb.	—	.26
Latex-Lube G.R.*	lb.	.19¼	.20
Lead Oleate	lb.	—	.29¾
Lindol* (dms., t.c.)	lb.	—	.32½
Locusol No. 1-6980*	lb.	.30	.34
2-Mercaptoethanol (dms.)	lb.	1.25	1.50
Methox*	lb.	.42	.43
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	—	.20
Methyl Stearate (dms.)	lb.	—	.30
Monoplex DOS*	lb.	.59½	.60½
DBS*	lb.	.65½	.66½
S-70*	lb.	.41	.42
S-71*	lb.	.46½	.47½
Montan Wax, Crude	lb.	.21	.26
Flaked	lb.	.29	.29
Morflex*	lb.	.32	.69½
Natac*	lb.	.1585	.1685
Nebony Resins* (dms.)	lb.	.04½	.05½
Neolene 210* (t.c.)	lb.	—	.16
212* (t.c.)	lb.	—	.14
220* (t.c.)	lb.	—	.15
Nerium*	lb.	—	.09
Nevillac Resins* (dms.)	lb.	.31	.85
Neville LX-880* (dms.)	lb.	.12	.13½
LX-685* (dms.)	lb.	.12	.17½
LX-782 (dms.)	lb.	.07½	.08½
LX-828* (dms.)	lb.	.11	.12½
LX-1000* (dms.)	lb.	.12	.13
Neville Resins* (dms.)	lb.	.07¼	.20
Nevindene Resins* (dms.)	lb.	.16½	.20
Nevinol* (dms.)	lb.	—	.24
No. 480 Oil Proof Resin*	lb.	—	.18
Ohopex Q10* (dms.)	lb.	.30½	.32
R9* (dms.)	lb.	.37¼	.37¾
OPD*	lb.	.29	.40
Ortho-Nitrobiphenyl	lb.	.13	.15
Ozokerite Wax, White and Yellow	lb.	.24	.31
Panaflex BN-1*	lb.	.18	.22¼
Panarez 3-210	lb.	.12½	.14
6-210	lb.	.12	.13½
12-210	lb.	.11½	.13
Paradene Resins (dms.)	lb.	.07¼	.08
No. 2 Flaked	lb.	.08	.08½
Para Flux* (dms.)	gal.	.22	.25
2016* (dms.)	gal.	.22	.26
Para Lube* (c.l.)	lb.	.046	.048
Paraplex G-25*	lb.	.76	.77
G-40*	lb.	.50	.51
G-50*	lb.	.40¾	.41¾
G-53*	lb.	.45	.46
G-60* (and G-61*)	lb.	.32¼	.32¼
G-62*	lb.	.33¾	.33¾
Parmo*	lb.	.06	.13½
Peroxidol 780*	lb.	.33¼	.36¼
781*	lb.	.34¾	.37¾
Petroflux MV*	gal.	.097	.177
Petrolatum (dms.)	lb.	.04¼	.14¾

PLASTICIZERS & SOFTENERS (Cont'd)

PG-16*	lb.	—	.35
Philrich-5* (t.c.)	gal.	—	.12½
Picco 10* (and 25*)	lb.	.15	.15½
60* (and 75*)	lb.	.14½	.15
100*	lb.	.14½	.17
Piccocizer 30*	lb.	.06½	.07
Piccolastic A* (B*, C*, D* & E*)	lb.	.24	.25
FT* (FHX* & FX*)	lb.	.1695	.1745
T-135*	lb.	.19	.20
Piccolyte S Resins*	lb.	.20½	.23½
Piccopale Resins*	lb.	.12	.13
Piccoumaron Resins*	lb.	.07	.18
Pigmentar* Pigmentaroil*	lb.	.510	.684
Pitt-Consol 500* (dms.)	lb.	.30	.30½
Plastac M*	lb.	—	.09¼
Plasticil	lb.	.10½	.11¾
NS	lb.	.11½	.12¾
Plasticizer 2286*	lb.	—	.26¼
Plasticizer 4141*	lb.	.42½	.43½
Plasticizer DP-200, DP-520*	lb.	.45	.45¾
DP-316*	lb.	.32¾	.33½
DP-317*	lb.	.46	.47¼
DP-8732*	lb.	.44¾	.46
Plasticizer LP*	lb.	—	.07
Plasticizer MP*	lb.	—	.08
Plasticizer MT-511*	lb.	—	.69¼
Plasticizer OLN*	lb.	.36	.42
Plasticizer SC*	lb.	.42	.46
Plasticizer W-13*	lb.	.37	.38¼
Plastoflex 3*	lb.	—	.52
52*	lb.	.37¾	.3o¾
VS*	lb.	.41¾	.42¾
Plastogen*	lb.	.08¾	.09
Plastolein 9050* (c.l.)	lb.	.54½	.56½
9055*	lb.	.30½	.32½
9058*	lb.	.48	.50
9250*	lb.	.38¼	.40¼
9715*	lb.	.39	.40
Plastone	lb.	.23	.27
Polycizer 162*	lb.	.27½	.29
332*	lb.	.42½	.44
562*	lb.	.28	.29½
662*	lb.	.28½	.30
532 and 632*	lb.	.42½	.44
ED*	lb.	—	.45
Polyco 438*	lb.	.34	.35
Polymel C-130*	lb.	.13¾	.14¾
D*	lb.	.22½	.23½
6*	lb.	.05¾	.07¾
Poly-Sperse AP-2	lb.	.23	.29½
AP-300, LC-20	lb.	.26	.32½
Poly-Sperse R-100	lb.	.17	.23½
Process Oil C-255* (c.l.)	gal.	.27½	.29½
Propylene Stearate (dms.)	lb.	—	.32
PRR 1*	gal.	.15	.35
PT 101 Pine Tar Oil* (t.c., dms.)	lb.	.0440	.0630
400 Pine Tar* (600* & 800*) (t.c., dms.)	lb.	.0440	.0630
PX-5	lb.	.21½	.22½
PX-7	lb.	.24	.25
PX-104* (dms.)	lb.	.31½	.33
PX-108* (dms.)	lb.	.29	.30½
PX-138* (dms.)	lb.	.29	.30½
PX-208* & 238* (dms.)	lb.	.42½	.43½
PX-404* (dms.)	lb.	.67½	.68½
PX-438* (dms.)	lb.	.61¼	.62¼
PX-800* (dms.)	lb.	.35¼	.36¼
PX-917* (dms.)	lb.	.35	.36
RC Plasticizer B-17* (dms.)	lb.	.23½	.24½
O-16* (dms.)	lb.	.30	.31
TG-8*&TG-9* (dms.)	lb.	.34½	.35½
TG-85* (dms.)	lb.	.36½	.37½
RC Polymeric BGA* (dms.)	lb.	.45½	.46½
Reogen*	lb.	.14¼	.14½
Resin C*	lb.	.0225	.0310
731D	lb.	.17½	.18½
Resinex*	lb.	.03¾	.05½
L-4*	lb.	.02¼	.04¼
Rexflex*	lb.	—	.15
Rosin Oil	gal.	.80	1.35
RR-10 (Neoprene)*	lb.	—	.37
R.S.O. Softening Oil*	lb.	.03	.05
RuBars*	lb.	.19¼	.20
Rubberol*	lb.	.18	.25¾
Santicizer B-16*	lb.	.46¾	.47¾
E-15*	lb.	.53	.54
M-17*	lb.	.44	.45
No. 140*	lb.	.35	.36
No. 141*	lb.	.36½	.37½
No. 160*	lb.	.27½	.29
No. 602*	lb.	—	.28½
No. 603*	lb.	.27	—
Sherolatum*	lb.	.03½	.06
Staflex DBES*	lb.	.58½	.61½
DOS*	lb.	.59¼	.62¼
IXA*	lb.	.32	.35
KA*	lb.	.34	.36¾
Stan Chlor Oils*	lb.	.13½	.20½
70*	lb.	.17½	.30
Stanolind Petrolatum*	lb.	.07	.156
Wax*	lb.	.31	.33
Staybelite Resin	lb.	.13¾	.15
Sunny South Burgundy Pitch*	lb.	.123	.1285
Rosin Oil*	gal.	.605	.76
Superla Wax*	lb.	.30	.397
Syncera Wax*	lb.	.16	.267
Syn Tac* (c.l.)	gal.	—	.33
Synthetic Revertant Oil	lb.	—	.16
Tar, Refined	gal.	.1200	.1760
Tarpine	lb.	.035	.050

PLASTICIZERS & SOFTENERS (Cont'd)

Terpene A*	gal.	—	.65
Tetraflex R-122*	lb.	.27	.30½
TP-90B*	lb.	.59	.69
TP-95*	lb.	.65	.75
Transphalt Resins*	lb.	.03¾	.05¾
Tributyl Phosphate	lb.	.52½	.53½
Tricresyl Phosphate	lb.	.35	.36
Triphenyl Phosphate	lb.	.41½	.43½
Turgum S*	lb.	.1460	.1560
Turgum SB*	lb.	.09½	.10½
Turpol NC-1200*	lb.	.67	.70
NC-1300*	lb.	—	.50
Vistac No. 1*	gal.	1.00	1.21
P*	lb.	.18	.18½
Vopcolene 50*	lb.	—	.31
Witcizer 100*	lb.	.26	.27
200*	lb.	.22¾	.25¼
300*	lb.	.30	.33½
312*, 313*	lb.	.28	.31½
412*	lb.	.42½	.46

PROCESSING AIDS

Castor Oil, Blown (dms.)	lb.	.25½	.26½
Refined (dms.)	lb.	—	.18½
Castorwax*	lb.	.25	.31
Dutrex 7*	lb.	.12	.20
ELA*	lb.	—	.82
Foamnix*	lb.	.60	1.50
Hydrofol Glycerides 200*	lb.	.15½	.19¼
Kenflex N*	lb.	.19	.26
Maleic Anhydride	lb.	—	.27
Millrex*	lb.	—	.15
Nadic Anhydride	lb.	—	.75
Polycin*	lb.	—	.24½
R-B-H Resin 510*	lb.	.19	.26
530*	lb.	.25	.32
STAYB*	lb.	.25	.45
Thiomalic Acid	lb.	—	3.50
Webmix*	lb.	1.25	2.00
Zyrox*	lb.	.78	.88

PROTECTIVE & STABILIZING AGENTS

Acacia*	lb.	.12¾	.21
Alcogum*	lb.	.08½	.24
Alpha Protein	lb.	—	.23
Aroostoocrat*	lb.	—	.07½
Carob Bean Flour	lb.	—	.50
Casein	lb.	.22	.35
Emcol K-8300* (dms.)	lb.	.14	.18
Ethylene Diamine 68%	lb.	.44	.47
Gum Arabic	lb.	—	.23
Karaya Gum	lb.	—	.35
Locust Bean Gum	lb.	—	.50
Modicol VD*	lb.	.13⅜	.15⅞
Prosein*	lb.	—	.06
Stablex B*	lb.	.50	.95
K*	lb.	.27	.35

RECLAIMING AGENTS

Amalgamator Z-4*	lb.	.34	.35
Armeen C*	lb.	.46	.52
Mixed Crude*	lb.	.19	.25
T*	lb.	.32	.38
Blend No. 27 Oil	gal.	.35	.42
Hurco RA*	lb	.05	.081
BWH-1*	gal.	.16	.17
C-6 Oil* (28* & 32*)	gal.	.33	.38
C-10 Oil*	gal.	.25	.30
C-33* (t.c.)	gal.	—	.21½
C-42* (t.c.)	gal.	—	.23
Caustic Soda—Flake 76% (c.l., dms.)	cwt.	—	5.20
Liquid 50% (t.c.)	cwt.	—	2.90
Solid 76% (c.l., dms.)	cwt.	—	4.80
Cresylic Acid (99-100%)	gal.	.85	1.39
D-4* (t.c.)	gal.	—	.27
E-5* (t.c.)	gal.	—	.25
Flake Calcium Chloride (77-80%)	ton	—	31.00
(94-97%)	ton	—	39.80
Gensol No. 6* (t.c.)	gal.	—	.42
Heavy Aromatic Naphtha	gal.	.13¼	.18½
LX-572 Reclaiming Oil*	gal.	.27	.32
LX-777 Reclaiming Oil*	gal.	.23	.33
Neo-Fat D-242*	lb.	.05½	.07¼
42-70*	lb.	.08¼	.10¼
No. 517 H.B. Oil*	gal.	.11½	.16½
535*	gal.	.22	.27
Nucom* (t.c.)	gal.	—	.42
Pitt-Consol 500 (dms.)	lb.	.25	.25½
500 NS* (dms.)	lb.	.33	.33½
640 (dms.)	lb.	.42	.42
PT 101 Pine Tar Oil* (t.c., dms.)	lb.	.0440	.0630
Q Oil* (t.c.)	gal.	—	.286
Reclaiming Oil 3186-G*	gal.	.26	.33
Reclaiming Reagent No. 1431*	lb.	.21	.25
R.P.A. No. 3*	lb.	—	.51
RR-10*	lb.	—	.37
Soda Ash (c.l., bags)	cwt.	—	1.85
Solvenol No. 1	gal.	.50	.67
No. 2	gal.	.41	.62
Solvent 534*	gal.	.20½	.26½
Solvent Oil 21*	gal.	.24	.29
C-42*	gal.	.23	.38
701 Oil*	gal.	.27	.29

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Dixiedensed (and S)*	lb.	.0775	.1550
Kosmobile (and S)*	lb.	.0775	.1550

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Channel, Medium Processing (MPC) (bags)

Arrow MPC*	lb.	.0850	.1625
Continental A*	lb.	.0850	.1625
Dixiedensed HR (and S-66)	lb.	.0850	.1625
Kosmobile HM (and S-66)	lb.	.0850	.1625
Micronex Standard*	lb.	.0850	.1625
Spheron 6*	lb.	.0850	.1625
Texas M*	lb.	.0850	.1625
Witco No. 1*	lb.	.0850	.1625

Channel, Easy Processing (EPC) (bags)

Collocarb*	lb.	.0710	.1485
Continental AA*	lb.	.0850	.1625
Dixiedensed 77*	lb.	.0850	.1625
Kosmobile 77*	lb.	.0850	.1625
Micronex W-6*	lb.	.0850	.1625
Spheron 9*	lb.	.0850	.1625
Texas E*	lb.	.0850	.1625
Witco No. 12*	lb.	.0850	.1625
Wyex EPC*	lb.	.0850	.1625

Channel, Conductive (CC) (bags)

Continental R-40*	lb.	.2600	.3500
Dixie 5 Dustless*	lb.	.1350	.2200
Dixie Voltex*	lb.	.2600	.3500
Kosmink Dustless*	lb.	.1350	.2200
Kosmos Voltex	lb.	.2600	.3500
Texas MC-74-BD*	lb.	.2600	.3500
Voltex*	lb.	.2600	.3500

Conductive Furnace Black (CF) (bags)

Aromex CF*	lb.	.0875	.1550
Continex CF*	lb.	.1100	.1700
Dixie CF*	lb.	.0925	.1600
Kosmos CF*	lb.	.0925	.1600
Shawinigan Acetylene Black*	lb.	—	.1900
Vulcan C*	lb.	.1100	.1850

Extra-Conductive Furnace Black (ECF) (bags)

Vulcan XC-72 (pellets)*	lb.	.2500	.3400

Furnace, Fast Extruding (FEF) (bags)

Arovel FEF*	lb.	.0675	.1350
Continex FEF*	lb.	.0675	.1350
Dixie 50*	lb.	.0675	.1350
Kosmos 50*	lb.	.0675	.1350
Philblack A*	lb.	.0675	.1350
Statex M*	lb.	.0675	.1350
Sterling SO*	lb.	.0675	.1350

Furnace, Fine (FF) (bags)

Statex B*	lb.	.0725	.1400
Sterling 99*	lb.	.0725	.1400

Furnace, General Purpose (GPF) (bags)

Arogen GPF*	lb.	.0600	.1275
Continex GPF*	lb.	.0600	.1275
Dixie 35*	lb.	.0600	.1275
Kosmos 35*	lb.	.0600	.1275
Statex G*	lb.	.0600	.1275
Sterling V*	lb.	.0600	.1275
V (Non-Staining)	lb.	.0600	.1275

Furnace, High Abrasion (HAF) (bags)

Aromex HAF*	lb.	.0775	.1450
Continex HAF*	lb.	.0775	.1450
Dixie 60*	lb.	.0775	.1450
Kosmos 60*	lb.	.0775	.1450
Philblack O*	lb.	.0775	.1450
Statex R*	lb.	.0775	.1450
Vulcan 3*	lb.	.0775	.1450

Furnace, High Modulus (HMF) (bags)

Continex HMF*	lb.	.0625	.1300
Dixie 40*	lb.	.0625	.1300
Kosmos 40*	lb.	.0625	.1300
Modulex HMF*	lb.	.0625	.1300
Statex 93*	lb.	.0625	.1300
Sterling L* and LL*	lb.	.0625	.1300

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF*	lb.	.0575	.1250
Dixie 20*	lb.	.0575	.1250
Essex SRF*	lb.	.0575	.1250
Furnex*	lb.	.0575	.1250
Gastex*	lb.	.0625	.1350
Kosmos 20*	lb.	.0575	.1250
Pelletex* and NS*	lb.	.0575	.1250
Regal*	lb.	.0575	.1250
Shawinigan Acetylene Black*	lb.	—	.1900
Sterling NS* and S*	lb.	.0575	.1250
R*	lb.	.0625	.1350

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace Super Abrasion (SAF) (bags)

Aromax SAF	lb.	.1150	-	.1825
Dixie 85	lb.	.1150	-	.1750
Kosmos 85	lb.	.1150	-	.1900
Philblack E*	lb.	.1150	-	.1900
Statex 160*	lb.	.1150	-	.1900
Vulcan 9*	lb.	.1150	-	.1900

Furnace, Super Abrasion, Intermediate (ISAF) (bags)

Aromex ISAF*	lb.	.0925	-	.1600
Continex ISAF*	lb.	.0925	-	.1600
Dixie 70*	lb.	.0925	-	.1600
Kosmos 70*	lb.	.0925	-	.1600
Philblack 1*	lb.	.0925	-	.1600
Statex 125*	lb.	.0925	-	.1600
Vulcan 6*	lb.	.0925	-	.1600

Furnace, Super Conductive (SCF) (bags)

Conductex SC*	lb.	.1150	-	.1800
Vulcan SC*	lb.	.1800	-	.2550

Thermal, Fine (FT) (bags)

P-33 (c.l.)*	lb.	——	-	.0625
Sterling FT (c.l.)	lb.	——	-	.0625

Thermal, Medium (MT) (bags)

Shellblack*(†)	lb.	——	-	.0250
Sterling MT (c.l.)	lb.	——	-	.0450
MT Non-Staining (c.l.)*	lb.	——	-	.0550
Thermax (c.l.)*	lb.	——	-	.0450
Stainless (c.l.)	lb.	——	-	.0550

Specialty Blacks (Awaiting Classification)

Neotex 100*	lb.	.0775	-	.1450
Neotex 130*	lb.	.0925	-	.1600
Neotex 150*	lb.	.1150	-	.1900
Regal 300*	lb.	.0775	-	.1450
Regal 600*	lb.	.0925	-	.1600

REINFORCING AGENTS—SILICA

Cab-o-sil*	lb.	.66	-	1.25
D. C. Silica (pelletized)*	lb.	1.45	-	1.65
Hi-Sil 233*	lb.	.08¼	-	.09¾
X303*	lb.	.50	-	.60
Santocel*	lb.	.62	-	.64
Ultrasil VN-3*	lb.	.35	-	.65
Valron Estersil*	lb.	2.00	-	2.25

REINFORCING AGENTS—MISCELLANEOUS

Angelo Shellac*	lb.	.40	-	.50
Cato 2* (100 lb. bag)	lb.	17.00	-	——
Darex Copolymer No. 3*	lb.	.47	-	.49
43G*	lb.	.39	-	.41
Darex Copolymer Latex No. 3-L	lb.	.41½	-	.46
Durez 12687 (and 12707)*	lb.	.36½	-	.40
Durez 13355*	lb.	.27½	-	.31½
Dymerex Resin	lb.	.15¾	-	.17
Good-rite Resin 2007*	lb.	.36	-	.38
2057*	lb.	.30	-	.31
Hystron*	lb.	.39	-	.41
Kralac A-El*	lb.	.39	-	.41
Lampblack	lb.	——	-	.12
Marbon 8000*	lb.	.36	-	.43
Marmix*	lb.	.35	-	.43
Mistron Vapor*	lb.	——	-	.03½
HGO-55*	lb.	——	-	.05
Pliolite Latex 150*	lb.	.35	-	.39
Pliolite Resin-Rubber Masterbatches*	lb.	.33	-	.57
Pliolite NR*	lb.	.93	-	.95
S6B*	lb.	.36	-	.43
Plio-Tuf G85C*	lb.	.52	-	.54
Polyco 220*	lb.	.18¼	-	.19¼
Poly-Phen 201-C; 218-C	lb.	.27½	-	.29
202-C	lb.	.36	-	.37½
Polypol S-70*	lb.	.25	-	.26

RETARDERS

Akron Benzoic Acid TBAO-2*	lb.	.41	-	.43
Dutch Boy Normasal*	lb.	——	-	.46
ESEN*	lb.	.39	-	.41
Good-rite Vultrol*	lb.	.67	-	.70
Harcopol 1183*	lb.	.70	-	.74
Retarder J*	lb.	.68	-	.70
PD*	lb.	.39	-	.41
W*	lb.	——	-	.46
Retardex*	lb.	.46	-	.46
TCM-25*	lb.	.60	-	.70
Wiltrol P	lb.	.37	-	.39

RUBBER SUBSTITUTES

Mineral Rubber

Byerlyte*	ton	55.00	-	62.00

Hard Hydrocarbon

Solid (dms.)	lb.	.03	-	.06
Granular (bags)	lb.	.03¼	-	.06¼
Herron Flake*	ton	——	-	45.00
Mineral Rubber, Solid	ton	42.50	-	44.50
M. R. No. 38*	ton	57.00	-	70.00

RUBBER SUBSTITUTES (Cont'd)

Vulcanized Vegetable Oils

Amberex*	lb.	.29	-	.36
Brown	lb.	.15	-	.24
Car-Bel-Lite*	lb.	.33½	-	.36
Neophax*	lb.	.17	-	.27
Car-Bel-Rex A and C*	lb.	——	-	.126
White	lb.	.15	-	.26
670 Brown	lb.	.14¼	-	.14¾

Miscellaneous Rubber Substitutes

Gilsowax B*	lb.	.09	-	.11
Resin No. 1098 (dms.)	lb.	——	-	.62
No. 1198*	lb.	.46¼	-	.49¾
Tysonite*	lb.	.30	-	.30¾

SOLVENTS

Acetone (dlvd.)	lb.	.10½	-	.12
Amsco Lactol Spirits* (t.c.)	gal.	——	-	.20
Naphthol Spirits*	gal.	——	-	.19
Mineral Spirits*	gal.	——	-	.18
Rubber Solvent* (t.c.)	gal.	——	-	.19
Solv A* (t.c.)	gal.	——	-	.22
Solv A-80* (t.c.)	gal.	——	-	.23½
Solv B* (t.c)	gal.	——	-	.28
Solv B-90* (t.c.)	gal.	——	-	.31
Solv D* (t.c.)	gal.	——	-	.30
Solv E*	gal.	——	-	.30
Solv F*	gal.	——	-	.30
Solv F-80*	gal.	——	-	.32
Solv G*	gal.	——	-	.36
Special Naphtholite* (t.c.)	gal.	——	-	.19
Special Textile Spirits*	gal.	——	-	.20
Super Hi-Flash Naphtha*	gal.	——	-	.34
Super Naphtholite*	gal.	——	-	.19
Textile Spirits* (t.c.)	gal.	——	-	.20
Amyl Chlorides, Mixed (t.c.l.) (dms.)	lb.	——	-	.11
Benzol 90%	gal.	.36	-	.40
Butyl Acetate	lb.	.17	-	.18½
Butyl Alcohol	lb.	.17	-	.19½
Secondary (dlvd.)	lb.	.15	-	.16½
Tertiary (dlvd.)	lb.	.15	-	.16½
Carbon Bisulfide, Tech.	lb.	.07	-	.08½
Carbon Tetrachloride	lb.	.10¾	-	.14¼
Cosol 1*	gal.	.37	-	.43
2*	gal.	.42	-	.48
Cyclohexane	gal.	.77	-	110.00
85% (c.l.) (dms.)	gal.	——	-	.56
Cyclohexanone	lb.	.31	-	.34½
Diacetone, Pure (dlvd.)	lb.	.15½	-	.17
Dichlorethyl Ether (dms.)	lb.	.15½	-	.16½
Dichloropentanes (t.c.l.) (dms.)	lb.	——	-	.06
Dicom*	gal.	——	-	.55
Halowax Oil*	lb.	.28	-	.41
Heptanes* (t.c.)	gal.	——	-	.1609
Hexanes (t.c.)	gal.	——	-	.1584
Isobutyl Acetate	lb.	.15¼	-	.16¾
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.62	-	.72
Ether, Ref. (dlvd.)	lb.	.09½	-	.11
Mersol*	gal.	.43	-	.79
Mesityl Oxide (dlvd.)	lb.	.15	-	.16½
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.66	-	.72
Methyl Chloride	lb.	——	-	.12¾
Methyl Ethyl Ketone	lb.	.15	-	.16½
Methyl Isobutyl Ketone (dlvd.)	lb.	.17	-	.18½
Methylene Chloride	lb.	——	-	.12½
N-5 Pentane Mix* (t.c.)	gal.	——	-	.13½
N-6 Hexanes* (t.c.)	gal.	——	-	.14½
N-7 Hexanes* (t.c.)	gal.	——	-	.13½
Nelio Dipentene	gal.	.41	-	.62
Penetrell*	gal.	.41	-	.42
Perchlorethylene	lb.	11¾	-	.15¼
Petrolene* (t.c.)	gal.	——	-	.14125
Picolines, Alpha, Refined	lb.	.43½	-	.44
Mixed	lb.	.32½	-	.33
Proprietary Solvent (dms.)	gal.	.66	-	.77
Propyl Acetate (t.c., dlvd.)	lb.	——	-	.11¾
Alcohol (t.c., dlvd.)	lb.	——	-	.11
Pyridine, Refined	lb.	.69½	-	.70
Quinoline	lb.	.50¾	-	.51¼
Rubber Solvent (t.c.)	gal.	——	-	.16
Rubsol (t.c.)	gal.	——	-	.12875
Skellysolve B (Hexanes)* (t.c.)	gal.	——	-	.16
C (Heptanes)* (t.c.)	gal.	——	-	.16¼
R (Rubber Solvent)*	gal.	——	-	.1390
Solvent, Crude, Light	gal.	.19	-	.28
Solvesso 100* (t.c.)	gal.	.33	-	.35
150 (t.c.)	gal.	.33	-	——
Sunny South DD Dipentine*	gal.	.41	-	.62
Sunny South DD Pine Oil*	lb.	——	-	.15
Sunray*	gal.	.1140	-	.1600
Toluene (dms.)	gal.	——	-	.38
Toluol (t.c.)	gal.	.25	-	.25
Trichlorethane	lb.	——	-	.12¾
Trichlorethylene	lb.	.12	-	.16¾
Triglycol Dichloride	lb.	.63	-	.64
Union Thinner 1* (t.c.)	gal.	——	-	.174
5* (dms.)	gal.	——	-	.199
7* (t.c.)	gal.	——	-	.164
2-50 W Hi-Flash*	gal.	——	-	.41
Xylol (t.c.)	gal.	.29	-	.30

STABILIZING AGENTS (for Vinyl Resins)

Advastab BC-12*	lb.	.90	-	.95
BC-74*	lb.	.70	-	.75
BC-105*	lb.	.75	-	.80
CH-101*; CH-201*	lb.	.60	-	.65
E-82*	lb.	90	-	.95
JCX*	lb.	.62	-	.67
L Paste*	lb.	.65	-	.70
SN*	lb.	.47	-	.52
T-10*	lb.	1.90	-	1.95
T-50-LT*	lb.	3.20	-	3.25
XBZ-155*	lb.	.69	-	.74
XC-143*	lb.	.90	-	.95
XE-98*	lb.	.53	-	.58
Amioca 50* 85* (bags)	lb.	11.11	-	11.26
Barca 10*	lb.	.65	-	.70
Barium Stearate	lb.	.41	-	.46
Basic Silicate White Lead	lb.	.16½	-	.17½
Cadmium Ricinoleate	lb.	——	-	2.00
Calcium Ricinoleate	lb.	——	-	.55
Dutch Boy DS-207*	lb.	——	-	.54
B*	lb.	——	-	.32½
Tribase*	lb.	——	-	.27½
Dythal*	lb.	——	-	.39½
Ferro 182* (dms.)	lb.	.70	-	.76
200* (dms.)	lb.	1.33	-	1.43
203* (dms.)	lb.	.87	-	.91
541* (dms.)	lb.	.35½	-	.45½
541A* (dms.)	lb.	.82	-	.86
700* (dms.)	lb.	.48¾	-	.58¾
900* (dms.)	lb.	.90	-	.94
903* (dms.)	lb.	.60	-	.64
909* (dms.)	lb.	.91	-	.95
920*	lb.	——	-	.98
931* (dms.)	lb.	.75¼	-	.85¾
993* (dms.)	lb.	.89	-	.99
1203* (dms.)	lb.	1.30	-	1.40
1206* (dms.)	lb.	1.32	-	1.36
1820* (dms.)	lb.	.90	-	.94
1825* (dms.)	lb.	1.00	-	1.04
1976*	lb.	.47	-	.51
Harshaw 1-V-3*	lb.	.43	-	.45
1-V-4*	lb.	.68	-	.70
1-V-7*	lb.	.70	-	.72
2-V-4*	lb.	.85	-	.87
2-V-8*	lb.	1.31	-	1.33
5-V-1*	lb.	.41	-	.43
6-V-1B*	lb.	——	-	.55
6-V-2*	lb.	——	-	.55
6-V-6*	lb.	——	-	.55
6V-10*	lb.	——	-	.55
7-V-2*	lb.	.93	-	.95
8-V-1*	lb.	.82	-	.84
8-V-100*	lb.	.82	-	.84
9-V-1*	lb.	.70	-	.72
12-V-5*	lb.	73	-	.75
24-V-1*	lb.	1.10	-	1.12
128-V-5*	lb.	.86	-	.88
Istabelan No. 115 Liquid	lb.	.85	-	.95
No. 120 Liquid	lb.	.65	-	.75
Kosol* (50 lb. bags)	lb.	19.00	-	——
Lithium Stearate	lb.	.52	-	.57
Fluffy	lb.	.47½	-	.70
Standard	lb.	.52½	-	.75
Mark A*	lb.	2.80	-	3.15
C*	lb.	.81	-	.84
E*	lb.	.72	-	.75
GS*	lb.	.77	-	.80
LL*	lb.	.59	-	.62
KCB*	lb.	.59	-	.62
M*	lb.	.59	-	.62
PL*	lb.	.62	-	.65
TT*	lb.	.72	-	.75
WS*	lb.	.97	-	1.00
X*	lb.	2.50	-	2.75
XI*	lb.	.87	-	.90
XV*	lb.	.84	-	.87
XX*	lb.	.57	-	.60
33*; 34*; 35*	lb.	.97	-	1.00
Metasap 613-A*	lb.	——	-	.69
613-B*	lb.	——	-	.84
613-C*	lb.	——	-	1.06
621*	lb.	——	-	.88
624*	lb.	——	-	.75
633*	lb.	——	-	.75
635*	lb.	——	-	.43
Modicol N*	lb.	.42½	-	.44½
S*	lb.	.30¾	-	.32½
Nonisol 100	lb.	.38	-	.43
Sodium Silicates 41°/1:3.2	cwt.	1.20	-	2.30
Stabilizer No. 52*	lb.	1.90	-	2.00
89X*	lb.	.75	-	.80
B-5*	lb.	——	-	.70
E6B*	lb.	——	-	.95
G-1*	lb.	1.25	-	1.40
HR*	lb.	.85	-	.89
L*	lb.	——	-	.60
OM-10*	lb.	——	-	1.95
Staflex OY*	lb.	1.00	-	1.20
QXMA*	lb.	——	-	.70
Stayrite 10*	lb.	.36	-	.41
P-10*	lb.	.43	-	.45
15*	lb.	.55	-	.57
20*	lb.	.41	-	.46
22*	lb.	1.00	-	1.13
25*	lb.	.35	-	.40
70*	lb.	.70	-	.72
71*	lb.	.90	-	.92
75*	lb.	.61	-	.63
76*	lb.	.53	-	.55
80*; 90*	lb.	.70	-	.72
95*	lb.	.70	-	.72
229*	lb.	.61	-	.63

STABILIZING AGENTS (Cont'd)

Vanstay AC* (dms.)	lb.	.45 -	.48
CE* (dms.)	lb.	.44 -	.47
HT* (dms.)	lb.	.87 -	.90
HTA* (dms.)	lb.	1.02 -	1.05
HTB* (dms.)	lb.	.70 -	.73
HTC* (dms.)	lb.	1.09 -	1.12
HTE* (dms.)	lb.	.80 -	.83
HTF* (dms.)	lb.	.77 -	.80
L* (dms.)	lb.	.32 -	.35
R* (dms.)	lb.	.67 -	.70
RR*; RRZ* (dms.)	lb.	.59 -	.62
RZ-25* (dms.)	lb.	.66 -	.69
S* (dms.)	lb.	.57 -	.60
SA* (dms.)	lb.	.81 -	.84
Z* (dms.)	lb.	.62 -	.65

STIFFENING AGENTS

Polyac*	lb.	—— -	1.85
Processinfi Stiffener 710*	lb.	.88 -	.90
Solvitose HDF, H. C-S, T, and E*	lb.	.22 -	.25
Versatil Gum 8-E*	lb.	.15 -	.19

SUN CHECKING AGENTS

Allied AA-1144*	lb.	.23 -	.24
AA-1177*	lb.	.15½ -	.16½
Antisol*	lb.	—— -	.23
Antisun* (Chipped)	lb.	.15½ -	.17½
(Slabbed)	lb.	.15 -	.17
Heliozone*	lb.	.31 -	.32
Microflake*	lb.	.20 -	.24
Nacconol NRSF*	lb.	.40½ -	.45
NBC*	——	-	1.67
Ross Sunproofing Waxes*	lb	—— -	.15
Sunolite*	lb.	.16 -	.22
127*	lb.	.16½ -	.20½
154*	lb.	.23 -	.25
Sunproof*	lb.	.32 -	.33
Improved*	lb.	.25 -	.26
Super*	lb.	.41 -	.42
Jr.*	lb.	.22 -	.23
Tonox*	lb.	.54 -	.56

SURFACE ACTIVE AGENTS

Anhydrapent*	lb.	.56 -	.59
Anhydrol 6990*	lb.	.51 -	.56
6991*	lb.	.51 -	.56
Aquarex D*	lb.	—— -	.81
G*	lb.	—— -	.21
MDL*	lb.	—— -	.33
ME*	lb.	—— -	.82
NS*	lb.	—— -	.60
SMO*	lb.	—— -	.50
WAQ*	lb.	—— -	.22
Emulphor EL-620*	lb.	—— -	.40
EL-719*	lb.	—— -	.58
ON-870*	lb.	—— -	.55
Hyonics*	lb.	—— -	.28¾
Igepal CA-630	lb.	—— -	.29
CO-630; CO-730*	lb.	—— -	.29
CO-850; CO-880*	lb.	—— -	.29
Igepon CN-42*	lb.	—— -	.25
T-33*	lb.	—— -	.21
T-51*	lb.	—— -	.13½
T-77*	lb.	—— -	.49
Kessco 50201*	lb.	—— -	.44½
50203*	lb.	—— -	.44¼
18201*	lb.	—— -	.32
18203*	lb.	—— -	.35½
Lipal 9-N,* 11-0*	lb.	.28 -	.29
8-0,* 6-0*	lb.	.29 -	.30
25C,* 52C*	lb.	.34 -	.35
15T*	lb.	.23 -	.24
Nacconol NR (dlvd.)	lb.	.14½ -	.16
NRSF (dlvd.)	lb.	.40½ -	.45
Phosphonol 0* (dms.)	lb.	.40 -	.41
H* (dms.)	lb.	.80 -	.81
N* (dms.)	lb.	.50 -	.51
T* (dms.)	lb.	.60 -	.61
Pluronic L62*	lb.	.33½ -	.39
L64*	lb.	.33½ -	.39
Sellogen Gel*	lb	—— -	.12¾
Soybean Lecithin	lb.	.13 -	.17
Synatol AV-60*	lb.	.28 -	.29

TACKIFIERS

Amalgamator Z-4*	lb.	.34 -	.35
Arcco 620-32B*	lb.	.20½ -	.21½
716-30*	lb.	.18½ -	.19½
1041-21*	lb.	.16½ -	.17½
Arcco A-2e*	lb.	.18 -	.19
Bunaweld Polymer No. 780*	lb.	—— -	.24
Gafex* (dms.)	lb.	.17¼ -	.20
Indopol H-300*	gal.	1.00 -	1.22
Koresin*	lb.	1.13 -	1.15
Liquid Rubber Flux*	lb.	—— -	.14
Nacconol NRSF* (dlvd.)	lb.	.40½ -	.45
Nilox Resin* (c.l.)	cwt.	—— -	16.00
Nopco 2271*	lb.	.16¾ -	.18¾
OPD*	lb.	.29 -	.40
PR-162 Resin Emulsion	lb.	.82 -	——
Resin V	lb.	—— -	.23½
Synthol* (dms.)	lb.	.26 -	.30¼
Vistac A*	lb.	.21½ -	.22¾
Vistanex LM Grades*	lb.	—— -	.45
Zirex* (c.l.)	cwt.	—— -	15.25
82 Resin Solid (dms.)	lb.	.13½ -	.14½
84 Resin Solid (dms.)	lb.	.13½ -	.14½

THICKENERS (For Latex)

Alcogum AN-6*	lb.	.06 -	.06½
AN-10*	lb.	.09 -	.10
AN-25*	lb.	—— -	.31
PA-15*	lb.	.13½ -	.17½
PA-15-B*	lb.	.13½ -	.17½
Betanol* (dms.)	lb.	.70 -	.95
CM Starch* (100 lb. bags)	lb.	26.85 -	——
Gomme Labolene*	lb.	.45 -	.47
Good-rite K-702*	lb.	.28½ -	.37
K-704*	lb.	.21 -	.22
K-705*	lb.	.30 -	.39
K-707*	lb.	.18 -	.19
K-708*	lb.	.28 -	.37
K-710*	lb.	.15 -	.16
Hycryl A-1000* (t.l.)	lb.	.090 -	.100
A-2000* (t.l.)	lb.	.335 -	.360
Hydroseal 3* (50 lb. bags)	lb.	9.19 -	——
Melojel* (100 lb. bags)	lb.	6.71 -	——
Modicol VD*	lb.	.13⅜ -	.15⅞
VE*	lb.	.13⅞ -	.16⅜
Poyco 296 BT*	lb.	.15 -	.16
296-N*; 530*	lb.	.15 -	.16
Propylene Laurate (dms.)	lb.	.57 -	.82
Sodium Silicate, 41°/1:3.2	cwt.	1.20 -	2.30
Solvitose Series*	lb.	.22 -	.25

VULCANIZING AGENTS

Peroxide

Di-cup	lb.	1.10 -	....
T	lb.	1.10 -	1.50
R	lb.	1.60 -	2.00
40C	lb.	.55 -	.75
UC XK-1960*	lb.	5.50 -	——

Selenium

Vandex*	lb.	—— -	6.50
VA-7*	lb.	—— -	.50

Sulfur

Blackbirdd* (c.l.)	cwt.	—— -	2.90
Cloud* (c.l.)	cwt.	—— -	2.85
Crystex*	lb.	.19½ -	.23
Darex Dispersed Sulfur*	lb.	.14 -	.16
Devil A* (c.l.)	cwt.	—— -	2.45
Dispersed Sulfur	lb.	.14 -	.16
Insoluble Sulfur 60*	lb.	.12½ -	.13
Ko-Blend IS*	lb.	—— -	.39
Mist* (Wettable) (c.l.)	cwt.	—— -	4.05
Spider* (c.l.)	cwt.	—— -	2.85
Star* (c.l.)	cwt.	—— -	4.90
Sulfasan R*	lb.	—— -	1.55
Tire* (c.l.)	cwt.	—— -	2.45
Tube* (c.l.)	cwt.	—— -	4.90
Vultac 2*	lb.	.47 -	.74
3*	lb.	.51 -	.78

Tellurium

Telloy*	lb.	—— -	5.00

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Advawet No. 10*	lb.	—— -	.17
No. 33*	lb.	—— -	.48
Aerosol 18*	lb.	.37 -	.42
AY*	lb.	.75 -	.80
MA 80%*	lb.	.40 -	.45
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OT 100%*	lb.	.75 -	.80
OT-B*	lb.	.65 -	.70

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Alrosperse*	lb.	—— -	.18
Alrowet D 65*	lb.	.31 -	.34
Anhydrol 6990* 6991*	lb.	.51 -	.56
Armacs*	lb.	.28 -	.77
Arquads*	lb.	.42 -	.61
Emcol 5100* (dms.)	lb.	—— -	.31
Energetic W-100	lb.	.28½ -	.35
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Ethomeen S/15*	lb.	.48 -	.50
T/15*	lb.	.46 -	.48
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PE-100*	lb.	.25 -	.27
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18201*	lb.	—— -	.32
Kreelon 4D* (dms.)	lb.	.13 -	.16
8G* (dms.)	lb.	.26 -	.28
Kyro EO* (dms.)	lb.	—— -	.29¼
Modicol N*	lb.	.42½ -	.44½
S*	lb.	.30⅞ -	.32⅞
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NRSF* (dlvd.)	lb.	.40½ -	.45
SL* (dlvd.)	lb.	.084 -	.10
60S* (dlvd.)	lb.	.19 -	.25
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WS 99	lb.	—— -	.95
Orvus AB Granules*	lb.	.16¼ -	.17¾
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Regal Beads	lb.	.12¾ -	.16¾
H. D. Beads	lb.	.12¾ -	.15¾
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Sorapon SF-73*	lb.	—— -	.18
SF-78*	lb.	—— -	.30
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Soybean Lecithin	lb.	.13 -	.17
Stablex G*	lb.	.50 -	.90
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7* (dms., dlvd.)	lb.	.43½ -	.44½
08* (dms., dlvd.)	lb.	.36½ -	.37½
P28* (dms., dlvd.)	lb.	.18½ -	.19
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Vultamol*	lb.	—— -	.17½
Wetsit Conc.*	lb.	.35 -	.35

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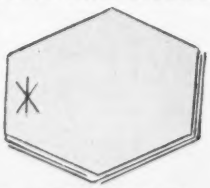

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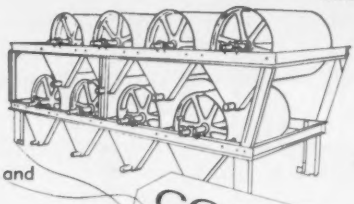

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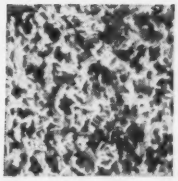

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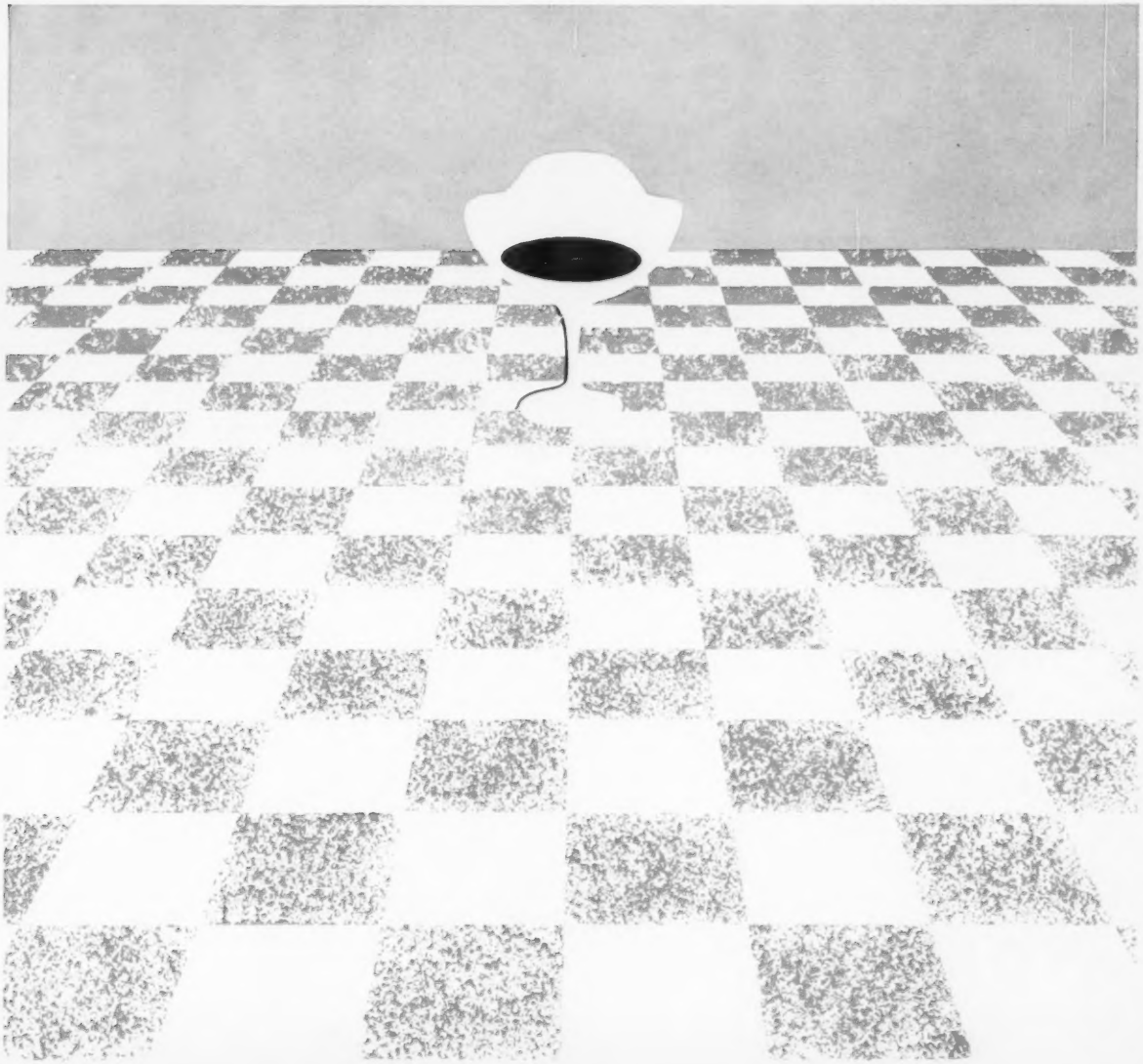

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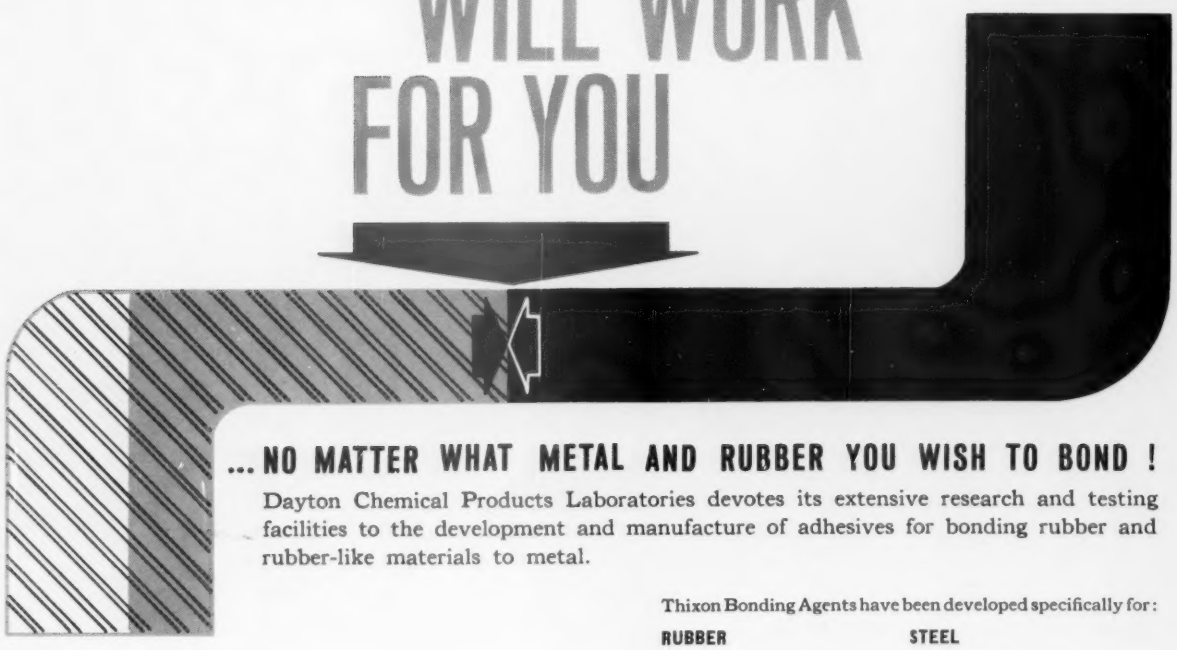

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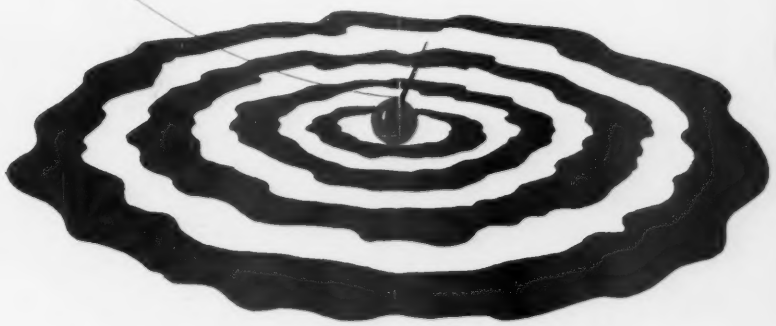

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